

In This Issue—Competition in Tire Sales

MOTOR AGE

Vol. XLIII
Number 24

PUBLISHED WEEKLY AT THE MALLERS BUILDING
CHICAGO, JUNE 14, 1923

Thirty-five Cents a Copy
Three Dollars a Year



A. L. DIXON

Is the Haynes Franchise Profitable?

HAYNES

Distributors say "YES"

"I have made big money selling Haynes cars for the past seven years."

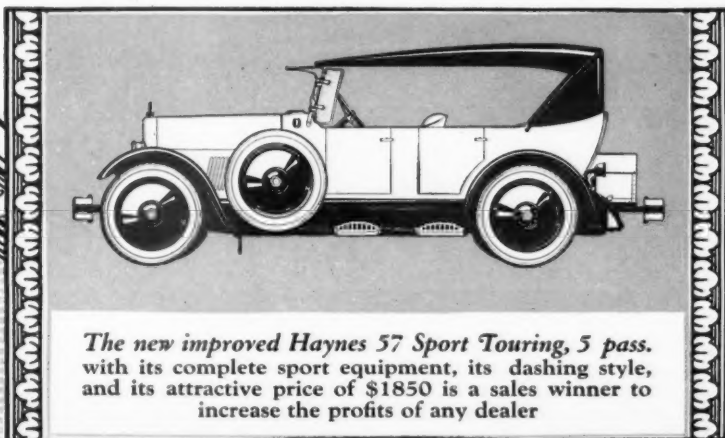
A. L. Dixon, Buffalo, N. Y., Haynes Distributor

HAYNES DEALERS ARE MAKING A RECORD IN SALES!

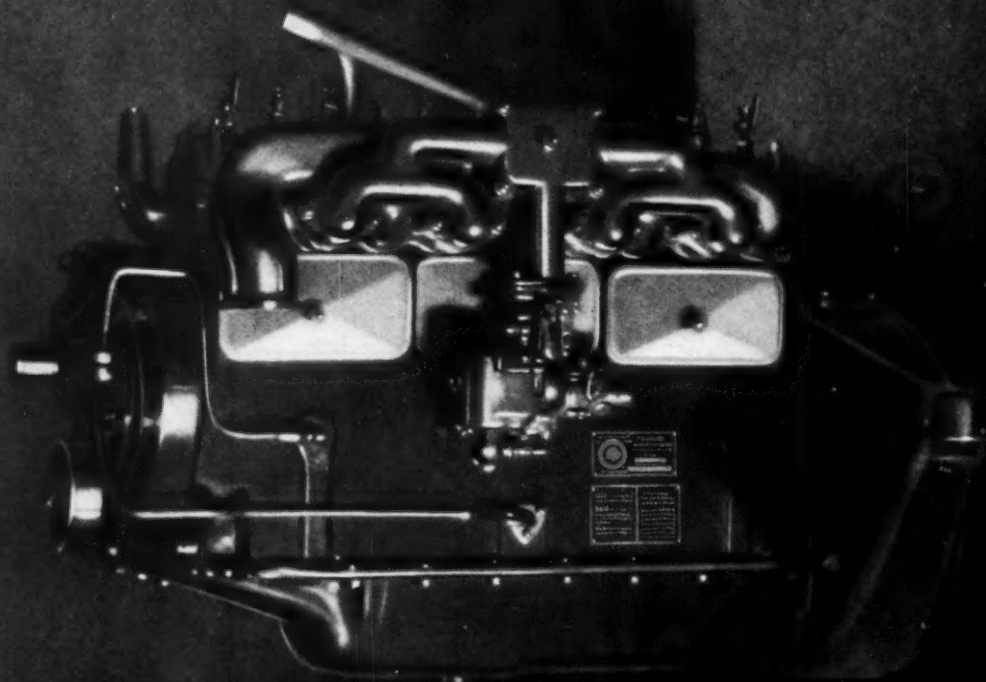
No wonder 1923 is such a tremendous year for the men who sell Haynes cars. With a range of prices from \$1495 to \$3395—with a range of fourteen models, in two distinctive sport and standard series—they win the maximum attention from car buyers. Are you interested in getting rich territory? Are you well qualified? Write, telephone or wire. Appointments in confidence if desired. Address Department 653.

THE HAYNES AUTOMOBILE COMPANY, Kokomo, Indiana

EXPORT OFFICE: 342 Madison Avenue, New York City, U. S. A.



The new improved Haynes 57 Sport Touring, 5 pass. with its complete sport equipment, its dashing style, and its attractive price of \$1850 is a sales winner to increase the profits of any dealer



*The New Series Model 6Y—
a passenger car motor. Just
one of the many Continentals
built to fill every passenger
car requirement.*

IN the specialized car or truck equipped with a Red Seal Continental Motor you can feel the power that is born of faultless construction and flawless quality. For twenty-two years such perfection has been represented by—the Continental Red Seal.

Built by the largest motor Specialists in the world

CONTINENTAL MOTORS CORPORATION

Detroit and Muskegon, Michigan





The enormous demand for ***QUALITY*** piston rings

DIDN'T JUST HAPPEN

FOR day by day, every week, month after month, year in and year out, ***QUALITY*** piston rings prove their right to leadership through consistent, dependable performance.

A performance resulting from intensive specialization.

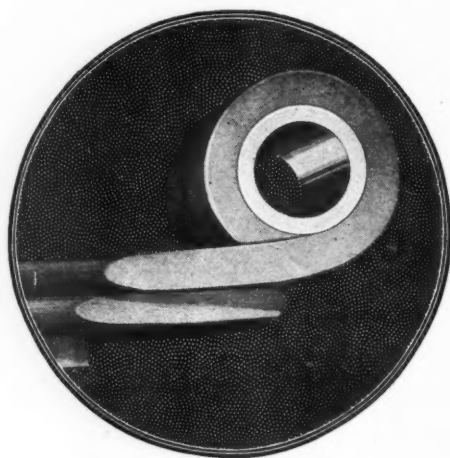
A performance resulting from accurate, quick-seating, resilient piston rings—from piston rings that are long lived and easy to install.

A performance recognized by more than 100 leading manufacturers for initial installation and by all leading jobbers, regrinders and dealers.

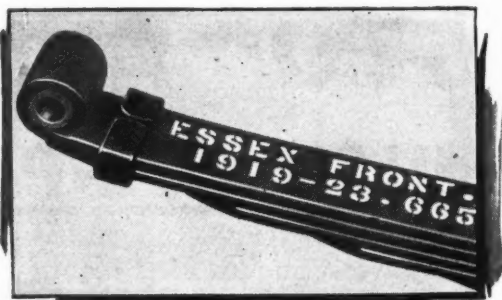
It is this consistent, dependable performance that is responsible for the enormous demand for ***QUALITY*** piston rings.

The Piston
RING COMPANY
Muskegon, Michigan

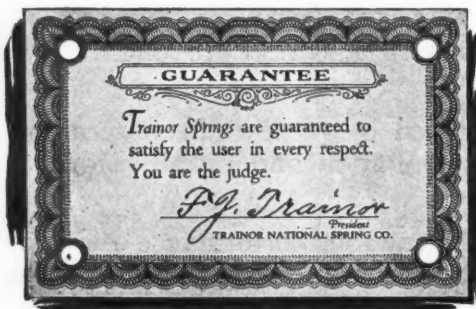
Three Big Points Of Trainor Superiority



Bronze Bushings



Easier to Keep Stock



Definite Guarantee

For longer wear, Trainor uses bronze bushings in all passenger car springs except those for Fords—even though original equipment was steel bushed.

For your convenience, the make and model of the car, the position (front or rear) and the catalog number are all plainly marked on every Trainor Spring. This permits Trainor Springs to be put into any stock without complicating the stock-keeping.

For your protection, every Trainor Spring is backed by an unqualified guarantee of satisfaction.

Who Offers More?

Check these points with those offered by other spring makers. Then you will understand why Trainor Springs build a permanent and profitable spring business for the jobber or dealer who sells them.

We invite correspondence with recognized automotive jobbers. Dealers should write for the name of the nearest Trainor jobber.

TRAINOR NATIONAL SPRING COMPANY
NEW CASTLE . . . INDIANA



MOTOR AGE

Reg. U. S. Pat. Off.

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A Sales Urge— Not a Sales Resistance

Let this Goodrich dealer speak for himself—and incidentally for thousands of other Goodrich dealers. We quote a paragraph:

"I find that tire buyers pretty generally realize the value of Goodrich tires and price doesn't enter into the sale the way it does on cheap tires. Sales are made more quickly and I don't have to give away any of the profit."

Walter H. Cobb,
Cobb Auto Supply,
Lakewood, Mich.

We have said before and we say again that the biggest asset a tire dealer can have is the reputation for superior service value which the public firmly associates with Goodrich Tires.

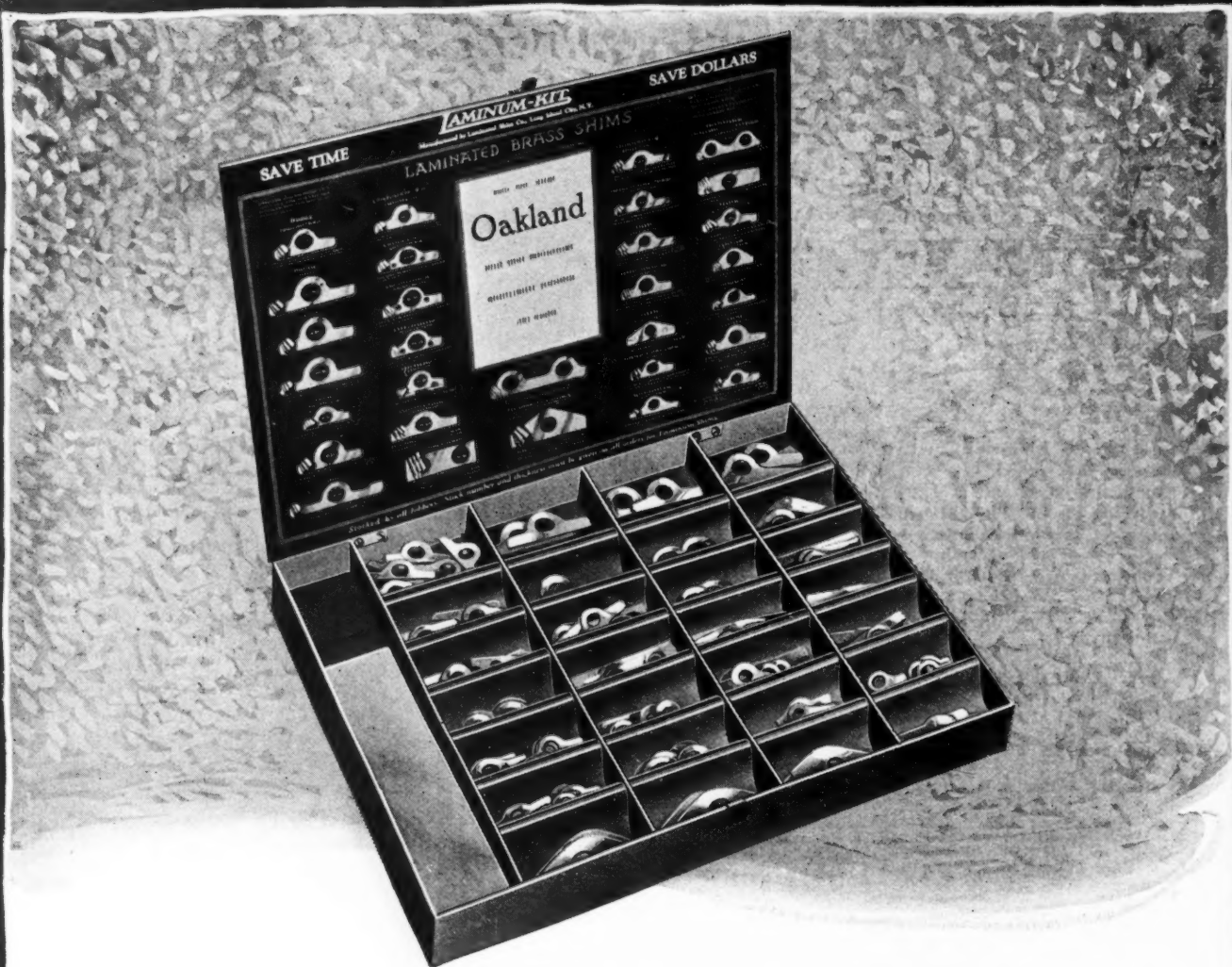
It has never been with Goodrich a question of good tires one year and indifferent tires next—or of changing sales policies which handicap the dealer.

Goodrich policy, like Goodrich quality, is fixed.

THE B. F. GOODRICH RUBBER CO.
Established 1870

Goodrich TIRES

"Best in the Long Run"



For AUTOMOBILE DEALERS

A new and important essential for the Service Department of *every* car dealer—this all-steel Kit containing an assortment of Laminated Shims for various models of the car the dealer sells.

For instance: Hudson-Essex dealers buy the Hudson-Essex Kit. Dodge dealers, the Dodge Kit. Buick the same and so on. A great time and labor-saving idea. Every shim in its place and instantly ready for the job. No hunting for shims: no lost motion: no wasted effort.

Refills quickly obtainable so that stock is always complete. The businesslike, orderly, up-to-date method of handling shims. Just take 'em from the Kit and peel 'em down to fit. A better adjustment in half the time and shims where you want 'em when you want 'em.

Ask Your Jobber

LAMINATED SHIM COMPANY, INC., 14th St. & Governor Pl., Long Island City, N. Y.
St. Louis: Mazura Mfg. Co.

LAMINUM



STUDEBAKER



The Best Dealer's Contract Ever Offered

The Studebaker contract is the fairest, squarest dealer contract ever written.

That is why you will find so many capable business men in the big Studebaker family—why the contract is so favorably regarded by bankers. Why, in fact, so many former bank executives have gone into the automobile business—with Studebaker.

That is also one reason why fewer Studebaker dealers go out of business probably than those handling any other line of cars.

Because of its many exclusive features and others which Studebaker was first to adopt, the Studebaker contract offers a genuine opportunity to business men.

But back of the contract, and Studebaker's seventy-one year reputation for honest manufacture and integrity, is another powerful factor—a vital factor—which is offered by no other manufacturer—a *complete line of Sixes*, ranging in price from \$975 to \$2750, and in capacity from two to seven passengers.

No wonder the Studebaker contract is so highly regarded by business men, bankers and everyone interested in the industry.

THE STUDEBAKER CORPORATION OF AMERICA
South Bend, Indiana

MODELS AND PRICES—f. o. b. factories		
LIGHT-SIX 5-Pass., 112" W. B., 40 H. P.	SPECIAL-SIX 5-Pass., 119" W. B., 50 H. P.	BIG-SIX 7-Pass., 126" W. B., 60 H. P.
Touring \$975	Touring \$1275	Touring \$1750
Roadster (3-Pass.) . 975	Roadster (2-Pass.) 1250	Speedster (5-Pass.) 1835
Coupe-Road. (2-Pass.) 1225	Coupe (5-Pass.) 1975	Coupe (5-Pass.) 2550
Sedan 1550	Sedan 2050	Sedan 2750

T H I S I S A S T U D E B A K E R Y E A R

Nash Leads the World in Motor Car Value

2000 May Orders Had to Be Cancelled

Though May production of Nash cars ran well beyond 6000 cars it was necessary to cancel more than 2000 May dealer orders.

And at this writing June orders bulk to so great a volume that the end of the month will see Nash again with more than 2000 unfilled orders despite the greatest production in our history.

These figures need no amplification. They tell their own story of the country-wide growth on a vigorously expanding scale of the popularity of the Nash car.

The history of the industry during the past six years reveals no parallel to the Nash Motors Company in its rapid rise to the very front ranks of the industry.

It is in no sense an overnight reversal of public opinion.

Instead, it is the successful blossoming of a national conviction that Nash cars do actually *lead the world in motor car value*.

And this is being reflected in the tremendously enhanced value of the Nash franchise regarded today as one of the prize contracts of the trade.

Your application for a good territory should be wired in at once.

NASH

THE NASH MOTORS COMPANY
KENOSHA, WISCONSIN

Nash Leads the World in Motor Car Value

(1703)

Sherer
Accessory
Case
(Patented)
No. 2245
Front view, as
your customers
will see it.



Put this handsome and efficient salesman to work for you!—

Auto accessories jump right out at the customer when attractively arranged against the rich, dark green felt with which this case is lined.

And the smaller items are laid out on a shelf just a few inches below the beveled plate glass top, which is accessible through narrow doors mounted on heavy spring hinges. The brilliant plate glass front and top affords an unobstructed view of the dozens of items on display. The sliding doors are equipped with locks.

You do not disarrange the displays when sale is made—the aeroplane view shows convenient arrangement of drawers with large handles and conspicuous labels—goods are delivered from these drawers and display remains intact.

This is one of the standard items in the complete line of Sherer store equipment and is built to the same high standards that have characterized our line for more than 50 years, which statement is certified by the fact that more than 80,000 retail establishments are equipped with Sherer Counters or Cases.

Special Accessory Case in 3 lengths

This case is furnished in 3 standard lengths as follows:
8 ft. 8 in.—12 ft. 2 in.—15 ft. 10 in.

All of the drawers are $14\frac{1}{2}$ in. long, $11\frac{7}{8}$ in. wide in three depths as follows: $3\frac{3}{4}$ in.; 7 in.; $15\frac{3}{8}$ in.; and their arrangement is the result of much experimenting with accessory stocks. They are close-fitting and keep the stock clean and always presentable.

Get our free suggestions

We have 4 factories where we manufacture a complete line of Counters, Wall Cases and Shelving equipped with drawers and bins.

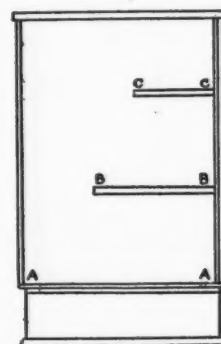
We can completely equip your salesroom with fixtures of wood and glass. Let us know your requirements.

Use the coupon, but do it today

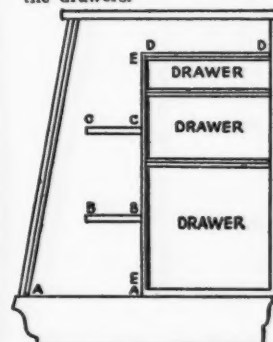
Sherer-Gillett Co.

Dept. 12, 17th & Clark St., Chicago

Top
view
The first
practical
case for
accessories.
Ideal combination
of display
and storage.



Ordinary Case
Compare the amount of display surface with the Sherer Accessory Case. It gives more display plus all the drawers.



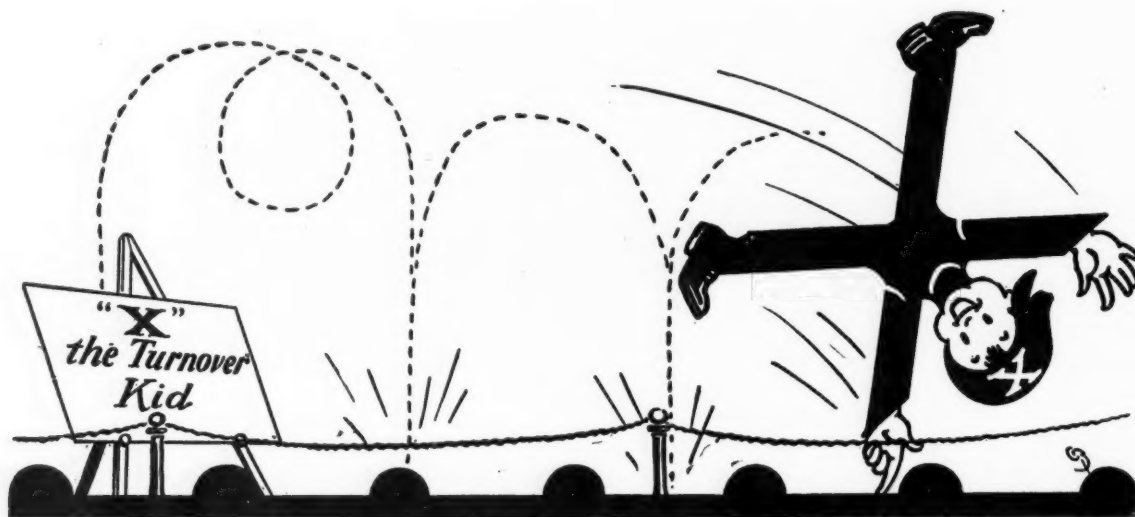
Sherer Special Case
About 50 per cent more display surface (Shelf D to D and Upright E to E) plus a lot of drawers occupying the space indicated.

Sherer-Gillett Co., Dept. 12, 17th & Clark St., Chicago

Gentlemen: We are interested in your Special Accessory Case as described in Motor Age and will therefore ask you to send us your special proposition for Case.....long, also for other equipment as follows:

Name

Street City State



More than 3,000,000 cans sold every year

7 Turnovers a Year!*

PRETTY snappy—what?
Stock an assortment of "X"
Liquid (one can FREE) put an
"X" Display in your window and
watch "X" do the handspring act!

Nearly every car owner uses "X" Radiator Liquid. Every car owner needs it to prevent and repair radiator leaks and remove scale from the cooling system.

"X" is a fast seller at a mighty good profit—a good item to push.

Used by U. S. Government, Standard Oil, Gen. Electric, Am. Tel. & Tel., etc., who test scientifically before adopting.

"X" Laboratories, 25 West 45 Street, New York
Factories: Boston and Montreal

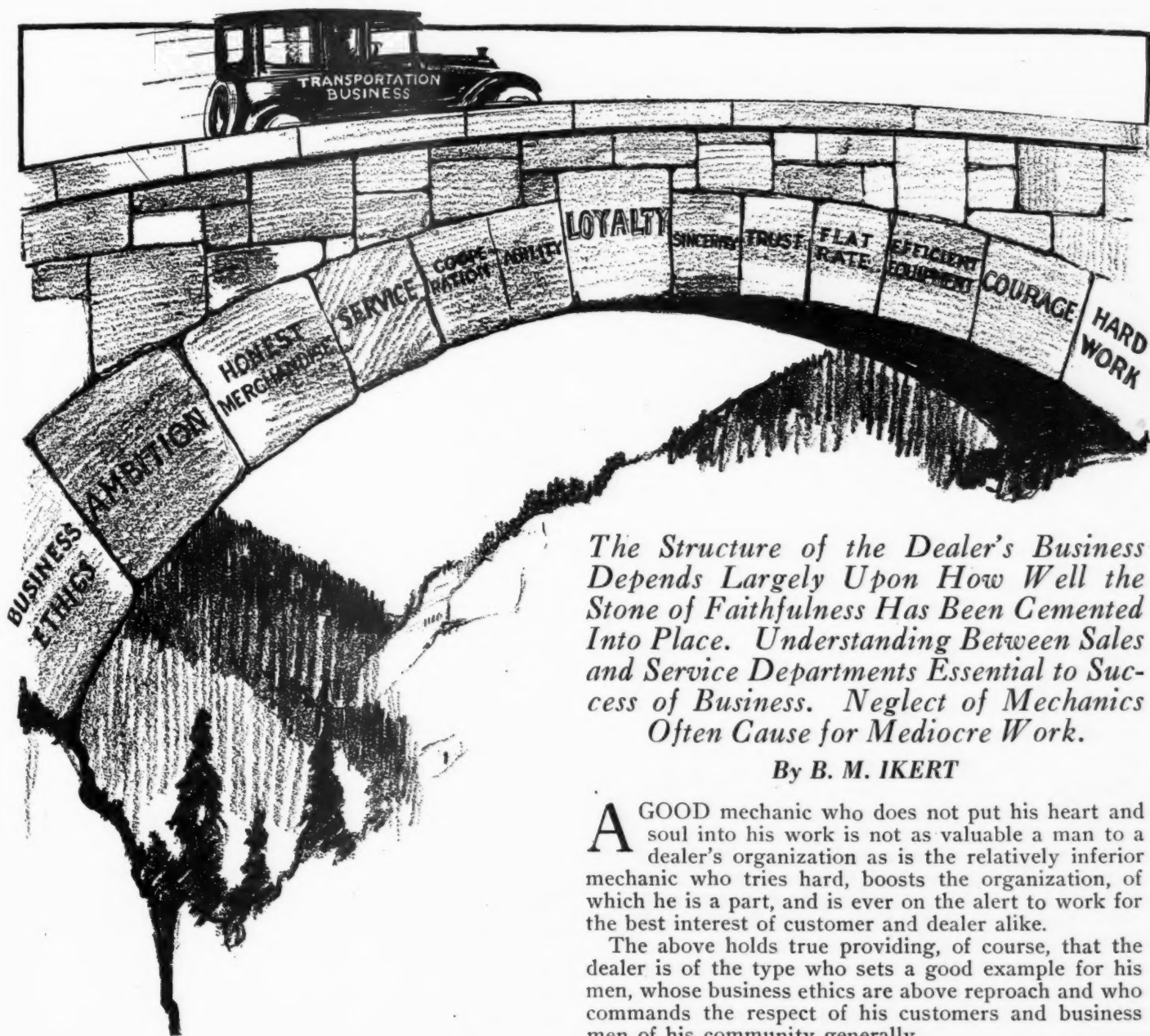
*Found through market investigation to be average turnover on "X" Liquid.

"X" Liquid

Makes Quick Profits

MOTOR AGE

Loyalty—The Keystone of the Transportation Store



The Structure of the Dealer's Business Depends Largely Upon How Well the Stone of Faithfulness Has Been Cemented Into Place. Understanding Between Sales and Service Departments Essential to Success of Business. Neglect of Mechanics Often Cause for Mediocre Work.

By B. M. IKERT

A GOOD mechanic who does not put his heart and soul into his work is not as valuable a man to a dealer's organization as is the relatively inferior mechanic who tries hard, boosts the organization, of which he is a part, and is ever on the alert to work for the best interest of customer and dealer alike.

The above holds true providing, of course, that the dealer is of the type who sets a good example for his men, whose business ethics are above reproach and who commands the respect of his customers and business men of his community generally.

All of which brings us to the ever-important subject in any business—loyalty.

We were asked by a dealer recently, to write some-

thing about loyalty as it applies to the motor car dealer establishment. This dealer states that his institution believes loyalty to be the master key which unlocks all the troublesome doors which bar the way to successful operation of a motor car sales and service organization.

Sometime ago MOTOR AGE published an article pointing out the fact that everyone in a dealer's organization was a salesman, potentially, at least. The mechanic who removes the carpet on the floor of a sedan or coupe before he works on the car, is a salesman, because the chances are when the carpet is put back it will be clean and in the same shape as when the customer brought in the car. The customer is pleased and the mechanic has properly "sold" the job. Another way to put this would be to state that the mechanic had been loyal to the customer, to the dealer and to the institution generally.

On the other hand, the mechanic who is careless about screwing back the crankcase plug and says to himself "Aw, let it go at that, nobody will know the difference," is not loyal to customer, institution nor to himself.

It rests largely with the dealer as to whether or not his employees are loyal, or have a desire to perform their duties faithfully. No dealer who looks upon the mechanics in the shop as a necessary evil can expect to win the loyalty of those men. They are far more apt to be loyal if they know that the dealer, first of all, is loyal to them and realizes that in his mechanics he has salesmen who meet a customer many more times than does the salesman who originally sold the customer his car.

The institution which provides decent toilet facilities for the shop men and provides a clean and inviting place for them to eat their lunches stands a far better chance of having such men boost the organization than does the institution which is suspicious of its men and does not go to the trouble of providing even good facilities for them to wash up.

Loyalty amongst other things means that in the dealer's place of business there will be harmony between all departments. Little is gained by an institution when the sales department, shop, quick service department, parts department and accounting department do their level best and the new car delivery department, let us say, falls down.

Nor is there anything to be gained when a salesman has sold a man a new car and then tells him that hereafter he will have to take up all matters with the service department, at the same time making an excuse for the deplorable conditions in that department. In fact, probably the greatest need at the present time in most motor car institutions is the exercising of loyalty in the relationship between salesmen and service men.

Salesmen in many instances like to rap the service department and likewise, the boys in the shop like to take a slam at the salesmen whenever they can. Generally you will find this to be the reason:

The salesmen in order to close the deal with a prospect is inclined very often to make promises which the service department cannot and should not make good. Then the salesmen when approached by the customer get mad and start cussing the service department. It is not uncommon to hear a salesman tell a customer that the "great trouble with this business is service." He says the mechanics are poor workmen, don't take any interest in their work and so on. All the time he is weaving a thread of disloyalty which sooner or later will react to the detriment of the whole institution. Mechanics can sense the feeling which exists against them. Let us look at the mechanics' side.

The writer frequently talks with the boys in the shop and generally speaking you will find them to be fellows made of the right kind of timber which would make them boosters for the organization which employs them, if they were met half way. This does not imply that conditions are bad in every transportation store. On the contrary we have some very wonderful sales and service establishments wherein every man from the president down to the lowly greasehound is as loyal to the organization as it is possible to be. You can tell this by the smiles on their faces and the pep they put into their work.

But to go back to the mechanics in the shop who are not so enthusiastic for their organization. Is it a wonder that they are peeved and find it difficult to be loyal when a customer

comes in and wants a job done saying "the man who sold me the car said you would gladly do this for me?"

Many a service manager and mechanic has had to scratch his head wondering how he is going to explain to a customer that what the salesman said was only a "wild" statement. Then the customer, perhaps, gets mad, says the service is rotten; complains to the salesman, who upholds him and finally when the dealer gets wind of it all, he himself begins to think that the shop is falling down on service, but being a necessary evil, he will have to tolerate it. And so on.

On further investigation where such conditions exist, you generally will find that such a dealer seldom holds a meeting of any kind in which every member of the organization participates. Ask a mechanic in such a shop if the "boss" ever gets together with them for a discussion of the common problems and he will answer something like this:

"They have a meeting every so often of the salesmen and heads of the departments, but we poor ducks in the shop don't get in on them. We get all our information or instructions from the bulletin board over there on the wall and if the foreman happens to feel good he may give us a little inside dope on what the 'chief' is going to do.

"The only time we all got together was when the boss wanted to have a picture taken of his employees to be printed in some kind of a folder he sent out to people who had bought cars from him. Upon another occasion all the boys in the shop were rounded up so the general manager could explain to us the new set of rules which were going into effect the next week.

"The rules weren't so bad, but the way they were handed to us was so raw that three of the boys quit that Saturday. You see the trouble is we fellows who have to get dirty once in a while in our work do not look good alongside a salesman dressed in a sport suit and I suppose we don't look like an asset to the business."

But let us interview a mechanic in a shop of a dealer who has instilled the spirit of loyalty in all his men. That mechanic will talk something like this:

"Gee. This is a peach of a place to work. Look at this place. Did you ever see a better lighted place than this? It's just as white as the boss himself. He sure does believe in making things pleasant for us. He comes around every so often and asks us how things are going.

"He bought us all some group insurance not long ago and even has a doctor come in every now and then to give us a physical examination. He says we cannot do our best work if we are not in tip top shape. And, he says he knows we are tired at the end of a day and do not feel like going to a doctor's office. So he has him come to the shop.

"Look at these shower baths he put in for us. And over here is a room in which we eat our lunch or visit during the noon hour. Notice the coffee urn? One of the boys knocks off a half hour earlier in the morning and his job is to make the coffee. Good stunt, don't you think?

"If you will notice, too, these fellows working on this floor are very careful of the customers' cars. See those fender covers on that car. Also, notice that this sedan has the carpet and cushions removed. No man up here works on a car until all such parts have been removed. The chief invited us all over to a meeting sometime ago at which a man lectured on service.

"He certainly said some fine things and next day the chief asked us all to write down the things which impressed us most. Among them the thought of taking care of the customers' car while it was in the shop seemed to make the biggest hit. So we put it into effect.

"We have a meeting, by the way, every two weeks; the whole bunch gets together, salesmen, mechanics and even Jerry gets in on them." (Jerry proved to be the car washer, a young colored boy.)

We could go on and quote this mechanic for a long time, but we believe enough has been mentioned to show that loyalty prevailed throughout this institution. The men were well paid. They were not watched. They were put on their own hook. The dealer and shop foreman had implicit faith in the men and they appreciated this. They had learned the value of loyalty.

They knew that one bungled job might create a customer who would knock the place too easily.

They realized that their bread and butter came from this place; that as it prospered, so would they also prosper. The dealer had shown them that they were as essential to the success of the business as all the new car sales, and in fact, more so. He trusted his men. He believed every one of them loyal and felt their records would speak for them.

Along this line MOTOR AGE received recently a copy of a bulletin which the Opitz Motor Co., Clarinda, Iowa, handed to all its shop employees. This company advertises as "The House of Service" and some of the things set forth in the bulletin to the men have so much real meat in them that they can well be reprinted here. The bulletin follows.

Will you kindly cooperate and lend your very best efforts toward backing up this advertising slogan and bringing to our patrons a realization that we do our work exactly as we advertise, a satisfied customer is our biggest asset. Exert your every effort to give each and every customer perfect satisfaction. Better service means better business in all departments, our shop is the best salesman we have. A chain is not stronger than its weakest link and our shop can be no better than its poorest mechanic—that means that every one of you must turn out work that is perfect in every detail. We have a good reputation as a service station but there is still room for improvement. You have done good work in the past but better work can be done and you are the boys that can do it. The following set of rules are issued to speed up work and increase the efficiency of our service. Will you kindly commit them to memory and faithfully put them into practice? And remember this—you are never fully dressed and ready for work until you have put on a smile.

As we add new equipment we must change our methods to conform in order to attain the maximum of efficiency in each department. The following rules become effective at once.

Rule 1—Do no work of any kind without a yellow order sheet.

Rule 2—When assigned to a job, ring in on the work sheet and enter the order number on your summary time card and ring in on it. When leaving job ring out on work sheet and summary card.

Rule 3—Where more than one man works on job each should specify work he does by drawing ring around it and inserting his number.

Rule 4—After ringing in on a job you are absolutely responsible for that job until you ring out on it and turn it over to the foreman for inspection and delivery. Car must leave the shop as neat and clean as when it came in.

Rule 5—When working on a coupe or sedan, never step inside the car without first removing the carpet and spreading oil cloth over seat.

Rule 6—10 minutes time will be allowed each day for ringing summary cards and order sheets must check together and show at least nine hours and fifty minutes time.

Rule 7—When ordering parts from the stock room proceed as follows: Enter order number, list parts, send basket and go back to work. When basket returns get parts. Do not fail to enter order number on slip as no orders will be filled without same.

Rule 8—When ordering parts to be used in assembling a new car, put car number on order slip and note "Ass. use."

Rule 9—Make order slips for presto, or other shop supplies.

Rule 10—Failure to comply with any of the above rules shall cause all labor on order where error occurs to be forfeited by shopman making error and no credit will be given for same on chart. As the labor chart is our method of judging the quantity and quality of your work this means a lot.

Rule 11—Before leaving to unload cars be sure you are properly rung in on an unloading order, be sure you ring out when you come back.

Rule 12—Shop men will take turns cleaning out shop. Ring in on your summary card and make notation under Order Number "police shop." Keep the shop spic and span all the time.

From this day forth

We are not going to watch you or try to keep you at work. Your record will show for itself. We trust you absolutely. We believe that every one of you are loyal and that you will do the very best you can. Your worth to the firm is governed by the following things:

- 1—The quality of your work.
- 2—The quantity of your work.
- 3—Your willingness to work.
- 4—Your spirit of cooperation.
- 5—The length of your service.
- 6—The honesty of your service.
- 7—Your moral character.

We want you to earn more money but we cannot give it to you until you earn it. Whenever your record shows that you are worth more money to the firm you will get it, and you won't have to ask for it either. We are always willing to listen to any complaints of any kind, but we would rather listen to suggestions for increasing the efficiency of our organization.

We extend to each one of you our sincere thanks for your loyalty and cooperation during the past but we are going to expect more of you this year than ever before. We want to make our service talked about for miles around and it is up to you to make this possible. Remember that our sales depend on the quality of our service, and that the quality of our service depends on you. We are all good "Buddies"—let's pull together and make 1923 a real hum-dinger of a year in all departments.

Similar bulletins were sent to all other departments and the company states they produced real results.

23 Years Ago This Week In Motor Age

(From MOTOR AGE of June 14, 1900.)

The Selden Patent Suit

NEW YORK, June 9 (1900)—Automobilism is in for a fight in the courts over an alleged foundation patent of one of the classes of motor vehicles, nearly as important and momentous as is the bottom bracket suit to cycling.

The ownership of a patent is claimed covering, it is alleged, all liquid hydrocarbon gas engines connected with road vehicles, and that means all gasoline automobiles, for the claim is that the patent in question is a foundation patent embracing them all and it will be so contended in the courts in the battle about to be begun.

The Columbia & Electric Vehicle Co., originally the automobile department of the old Pope Mfg. Co., but now one of

the component companies of the Electric Vehicle Co., an operating corporation, has served the leading makers of gasoline vehicles in this country with notice of an infringement of the Selden patent, owned by it.

(There follows the complete history of the Selden patent, with the specifications in full and the drawings as filed with the Patent Office.)

New York Automobile Show

NEW YORK, June 11—Floor plans and invitations for applications for spaces were sent out on June 1 for the show of the Automobile Club of America, at Madison Square Garden, Nov. 3 to 10, under the management of Frank W. Sanger.

Locomotive Improvements

The Locomobile Co. of America, despite

the fact that they have been rushed to death with orders, have found—or made—time to add a great number of improvements to their No. 2 Locomobile, although keeping the price the same, viz., \$750.

Stearns Gets Into Business

CLEVELAND, June 11—R. M. Owen, of the Phoenix Automobile Co., and Frank Stearns, of the F. P. Stearns Mfg. Co., made a run to Painesville, 30 miles, to test a new vehicle which they have recently completed. They covered the distance in a trifle more than two hours. Both concerns mentioned are preparing to manufacture vehicles of the gasoline type and both have completed several experimental machines.

Packard Single Eight Featured With Four Wheel Brakes

Car Designed With View to Keeping Maintenance Costs Low. Two Wheelbase Lengths, 136-in. and 143-in. Nine Body Styles Available. Brakes Are Mechanically Operated. Crankshaft Has Nine Bearings. Single Six to Be Continued as Heretofore

THE single eight just announced by the Packard Motor Car Co. is an effort on the part of the company to provide a car with maximum performance, comfort and accessibility, with price a secondary consideration.

Although the car is relatively high priced, the design has been studied with a view to keeping maintenance cost low and many features of the new design are concerned with attaining this result through durability and accessibility.

The Packard single eight supersedes the twin six and will be made in two wheelbase lengths, 136 and 143 in. Nine body styles are available with a price range from \$3650 for the five-passenger touring up to \$4950 for the seven-passenger limousine. Six of the bodies are mounted on the shorter chassis and three on the longer. The Packard single six

will be continued as the backbone of the line, without alterations.

The eight in line engine was selected because of its overlapping, relatively light, individual power impulses, the ability to balance it in such a way as to eliminate any perceptible period within the driving range without any sacrifice in accessibility.

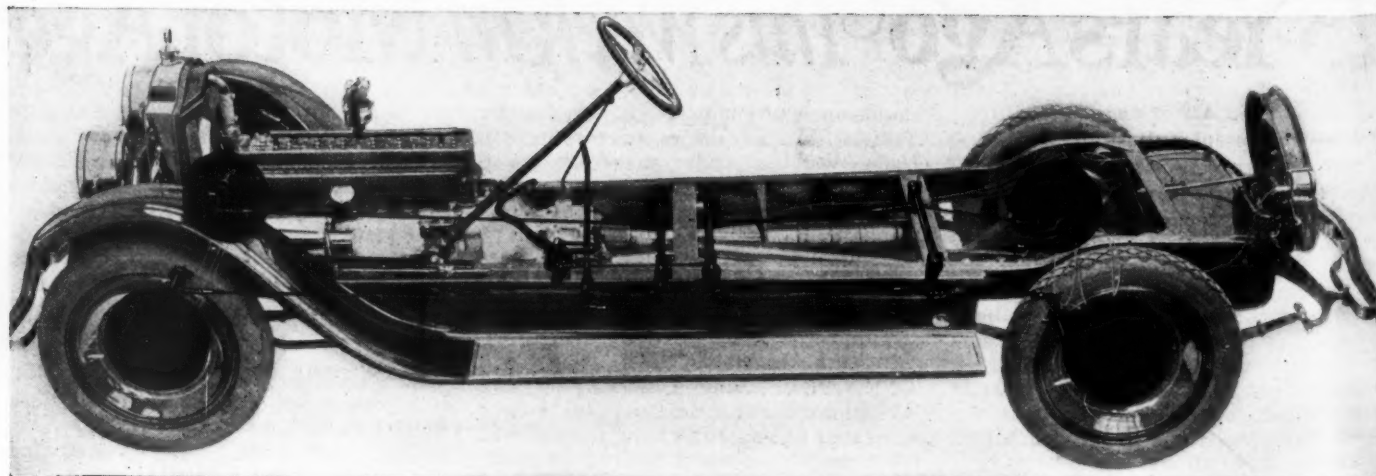
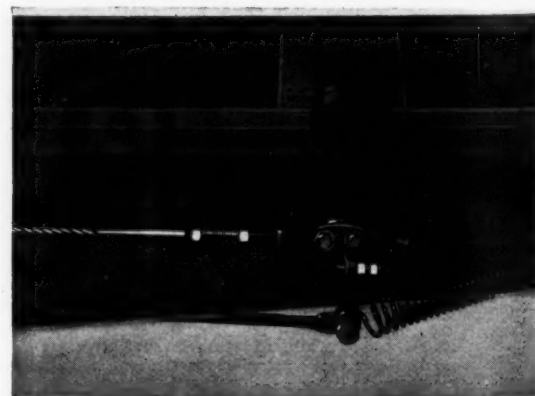
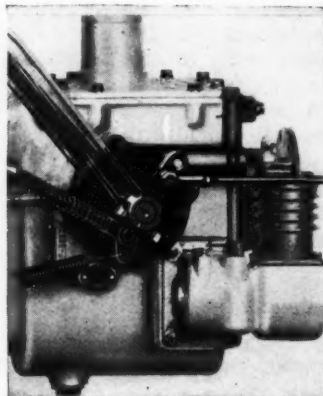
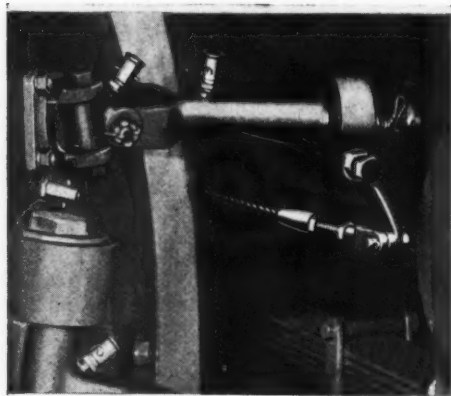
With the rapid acceleration and tremendous speed range of the power plant, four wheel brakes have been installed to provide corresponding deceleration characteristics. There also is the advantage of reduced rear end side skidding and greater lasting qualities of the brakes themselves.

The eight-in-line engine is a 3% by 5 in. block cast, L-head type. The piston displacement is 357.94 cu. in. The engine nominally develops 85 hp. at 3,000

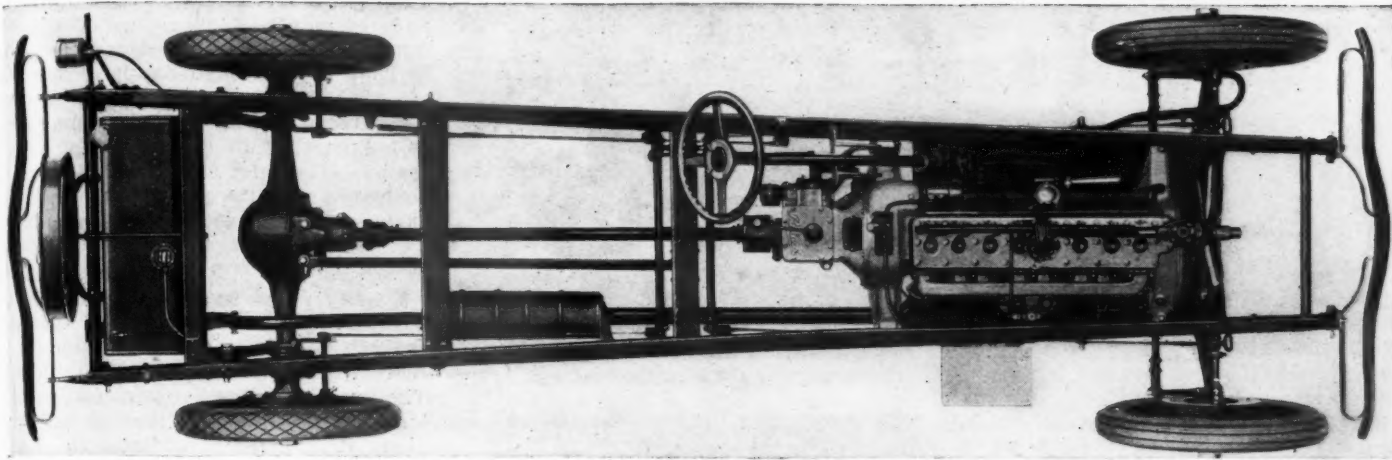
r.p.m., this being the figure used in the design calculations and approximates the output on the block. The engine is combined with the clutch and transmission gearset as a unit powerplant with four-point suspension.

Insofar as the individual cylinders, pistons, connecting rods, valve action and valve gear, are concerned, the engine follows usual practice. The crankshaft, however, because of the linear arrangement of the eight-cylinders, involves some interesting factors which are particularly concerned with the elimination of vibration. The crank pins for cylinders No. 3, 4, 5 and 6 lie in one plane at right angles to the common plane of the crank pins for cylinders 1, 2, 7 and 8.

This crankshaft arrangement has been chosen because of its freedom from



Top left, brake operating shaft on Packard front wheel brake with universal joint at outer end and split joint on inner end of brake shaft. Top center, mounting of planetary brake gear at base of brake pedal. Top right, attachment for operating hand and foot control of rear wheel brakes. The foot brake is connected by cable on loose lever on the cross shaft



Plan view of chassis showing the mounting of the eight-in-line engine, with unit powerplant clutch and gearset. The chassis design is clean as will be noted

planar vibration. In addition, a nine bearing construction is used to provide a small intervening span between the main bearings, giving a rigid support to the crankshaft to eliminate all perceptible transverse vibrations. For torsional stiffness, large diameters of main and crank pin journals are employed and to eliminate any effects of synchronism, a vibration damper is fitted to the front end of the crankshaft. With the engine supported in the chassis frame at four points by integral crankcase arms, two at the forward end and two at the flywheel housing, it is claimed that all twisting strains in the crankcase and cylinder block are eliminated, resulting thereby in reducing vibration due to torque reaction.

The cylinder block is cast of hard grey iron, and so designed that water completely surrounds each cylinder barrel with large water passages to the separately cast heads. The crankcase is an aluminum alloy casting made in two parts. The crankshaft and camshaft bearings are in the upper part of the case and the lower part forms the oil reservoir. The lower half can be removed without disturbing the crankshaft bearings, the front cover or the clutch and transmission gearset assemblies. There is an inspection opening in the upper half over the flywheel to facilitate checking the timing and also one at the front end of the case for inspecting the chain adjustment.

The pistons are aluminum alloy, slotted and of the three ring type. These, in connection with the other reciprocating parts are designed for lightness, the total reciprocating weight per cylinder being 1.78 lbs. The pistons are 3.625 in. in length and carry the three $\frac{1}{8}$ -in. rings above the piston pin. There is an oil groove at the bottom of the piston skirt. The piston pin is anchored in the piston with the bearing in the upper end of the connecting rod. The outside diameter of the pin is $\frac{7}{8}$ -in. and the bearing length $1\frac{1}{4}$ -in. The connecting rods are I-beam section 10-in. long from center to center.

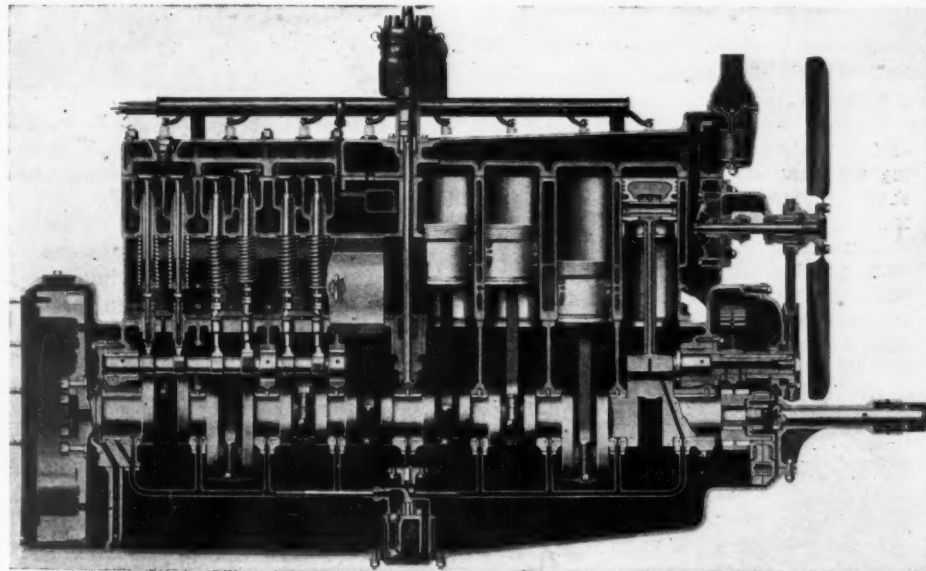
The crankshaft is drop-forged high carbon steel, heat treated, machined all over and machine balanced. There are

nine main bearing journals, finish ground and lapped to size. The crankshaft is drilled from each main bearing to the adjacent connecting rod bearing for the purpose of forming oil ducts which supply oil under pressure to each connecting rod bearing, as explained in the description of the oiling system. The crankshaft thrust is taken on the rear main bearing and an oil guard is provided at that point to eliminate the leakage of oil. The crankshaft bearings are of the bronze shell, babbitt lined type. The main bearings are $2\frac{1}{8}$ in. in diameter and vary in length from $13/16$ in. to $2-15/16$ in.

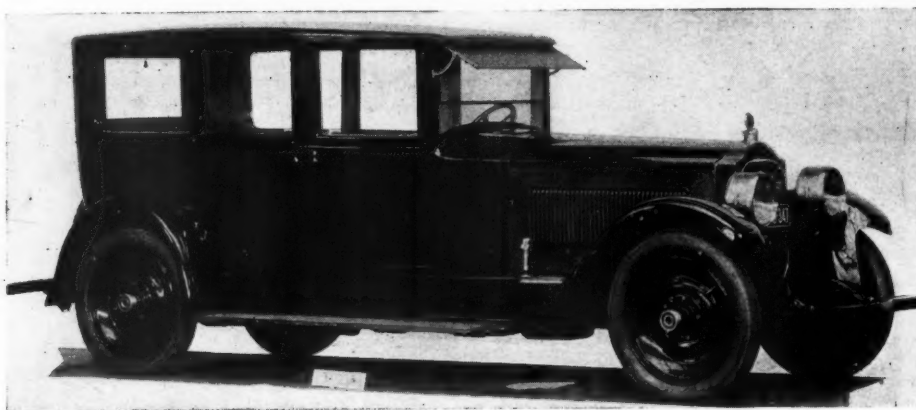
A $1\frac{1}{2}$ in. triangular drive, Morse silent chain, drives the camshaft and generator shaft from the crankshaft. This chain is adjustable by moving the pivoted generator. To adjust the chain, the three nuts on the generator flange stud are loosened. Since the generator pivots about the lower stud, the top of the generator is rotated about it, away from the engine, until the chain has the proper tension. The camshaft is of drop forged steel with 16 integral hardened and

ground cams. A spiral gear is forged and machined integrally with the camshaft at the center. This gear drives the gear oil pump below and the ignition assembly above. The hollow center of the shaft formed by drilling, forms an oil lead to the camshaft bearings. The camshaft bearings are aluminum permanent mold castings, except the front bearing, which is subjected to the driving load and is babbitt lined.

The camshaft operates the valves through rocker levers pivoted from the crankcase. The rotation of the cams lifts the free ends of the rocker levers through contact with the cam followers located approximately at the centers of the rocker levers. With this arrangement, one end of the rocker lever is securely pivoted to the crankcase and the other end is raised or allowed to lower by the action of the cam and the follower. The free end is directly underneath the valve tappets and the motion which opens and closes the valves is transmitted to the tappets, consequently without side or rotating motion. This construction is used to reduce wear on



Longitudinal section through Packard single-eight engine, showing the nine-bearing crankshaft, six-bearing camshaft, mounting of the water pump on the fan shaft, thermostat installation, distributor and oil pump drive and general arrangement of units



The Packard seven-passenger sedan, which is mounted on the 143-in. wheelbase chassis

the valve tappet guides and insure quiet operation of the valves and tappets.

There is one inlet and one exhaust valve to each cylinder. The inlet valves have a clear diameter of $1\frac{1}{8}$ in. and the exhaust valves a clear diameter of $1\frac{1}{2}$ in. The lift on both valves is $\frac{11}{32}$ in. and both the intake and exhaust valves are 45 deg. type. The valves are timed so that the inlet opens at 10 deg. after top center and closes 45 deg. after bottom center. The exhaust valve opens 50 deg. before bottom center and closes 5 deg. after top center. The firing order is 1-3-2-5-8-6-7-4.

The supply for the fuel system is drawn from the main tank at the rear of the frame through a vacuum tank on the dash and thence by gravity to the carbureter. The capacity of the main tank is 21 gal. A Stemco gasoline gage is mounted on the instrument board. One carbureter supplies the entire eight cylinders. It is mounted on the right side of the engine and is supported by the intake manifold which also contains the fuelizer. The carbureter is the regular Packard air-valve type with a two-stage spray nozzle and a cylindrical mixing chamber. The fuelizer is the same as that used in previous Packard models, except that it is built directly into the manifold, providing a somewhat improved installation.

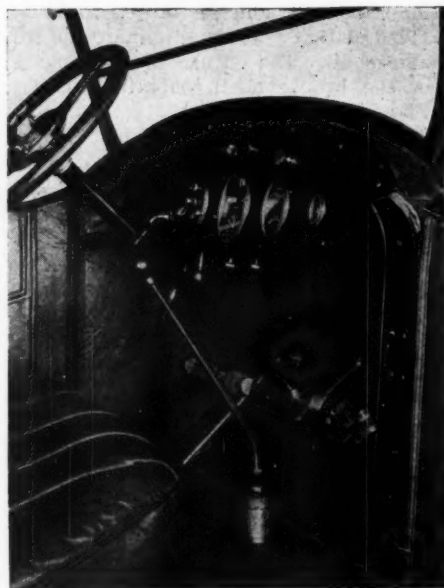
Lubricating oil is drawn from the crankcase reservoir through a strainer and is pumped to the main oil distributing manifold supported from the crankshaft bearing caps. From this manifold the oil is supplied to the nine main crankshaft bearings through holes drilled in the bearing caps. Independent oil passages in the cranks carry the oil to the connecting rod lower end bearings. The camshaft bearings are lubricated by oil which is forced to the hollow camshaft from the oil lead running from the crankshaft rear bearing to the camshaft rear bearing.

After passing through the camshaft and camshaft bearings, the oil passes out through the holes in the camshaft sprocket to the timing chain. The chain carries oil to the generator sprocket which also has holes leading the oil down to the generator shaft bearing.

After these bearings are supplied, the

surplus oil drains back into the crankcase oil reservoir.

The cylinder walls and piston pin bearings are lubricated by oil spray thrown from the lower end connecting rod bearings. Holes drilled in the crankcase allow oil mist to rise into the valve compartment and lubricate the valve mechanism. Baffle partitions located cross-wise in the bottom of the crankcase retard the surging of the oil. The



The instrument board used on the Packard single eight models. The Spanish leather upholstery used in the seven-passenger touring car will be noted

oil is circulated under a pressure of from 20 to 35 lbs. while running at 25 m.p.h. and not less than 2 lb. pressure at 5 m.p.h., with the standard rear axle ratio and the engine warm. These pressures are indicated on an oil gage mounted on the dash.

The oil pump is a gear type located at the lowest point of the crankcase and is operated by a shaft driven from the spiral gear on the camshaft previously mentioned. The pump may be removed for cleaning or inspection by taking off the lower half of the crankcase and unscrewing the nuts which hold it to the bottom of the upper half and discon-

necting the oil manifold. The oil pressure is regulated by means of the oil pump release valve, which is accessible through a cover plate in the bottom of the crankcase lower half. The oil relief valve is contained in the pump body. It is controlled by the tension of a coil spring. The inlet to the relief valve is connected with the pump discharge passage, and any excess pressure causes the valves to open and allows the oil to return to the pump inlet.

Cooling water is circulated by a centrifugal pump mounted at the forward end of the cylinder block. The pump is cast integrally with the cylinder block. The pump contains a centrifugal impeller which is driven by the fan belt, the pump shaft being a continuation of the fan shaft. The forward end of this shaft is carried on a roller bearing and an adjustable gland nut on the front end of the pump shaft permits the packing to be kept tight and prevents leakage. The roller bearing is lubricated through a connector which is located on the side of the pump housing.

The thermostat installation is very similar to that on the single six. The cooling capacity for this model is provided by an exposed frontal area of radiator core of 457 sq. in. with a core depth of $3\frac{3}{4}$ in., giving a block volume of core of 1540 cu. in., or 4.3 cu. in. of core per cu. in. of piston displacement. The fan is a 21 in. six blade aluminum type running at 1.3 times engine speed. The water capacity of the cooling system is $5\frac{1}{2}$ gal. A Motometer and winterfront with automatic thermostat-operated shutters, are provided as standard equipment.

The electrical system is the Packard Delco single wire type. The generator is supported on the crankcase at the right front corner of the engine and driven directly from the silent chain. The cutout relay is mounted on top of the generator. The starter motor is located on the left side of the engine close to the cylinder block and is attached to the front face of the flywheel housing by means of a long pilot and one dowel screw, permitting of ready removal for inspection.

The battery is a 100-amp.-hr. type mounted in an individual compartment located in the front fender. It is accessible by removing four screws which hold the aluminum cover plate. The wiring is enclosed in junction boxes and conduits and is entirely out of sight. Binding posts have been provided at the front of the dash to facilitate the removal of all wires and conduits when the body is removed. At the back of the dash, binding posts are provided for the connection to the coil and switch. The electric lighting system is protected by a circuit breaker at the back of the lighting switch on the instrument board. The connection for the stop light is incorporated in the brake mechanism.

The lighting system includes two main headlamps, combination tail and warning signal, instrument board lamp, toneau light in open bodies and dome light in the closed bodies. The headlamps provide three degrees of illumina-

tion. Lights of 25 to 30 cp., situated in the principal focus of the reflector, furnish a high degree of illumination when needed. For city driving, auxiliary lights of 20 to 25 cp., out of the principal focus, furnish a more diffused light and for parking a light of 2 cp. is furnished by a low filament in the auxiliary bulb. The Packard Delco ignition unit is mounted directly on the engine cylinder head between No. 4 and No. 5 cylinders and is driven from the camshaft. The coil is located on the rear of the dash.

The clutch is a non-adjustable dry plate type with five driving plates. It is mounted in a separate compartment at the front end of the integral clutch and transmission case. The clutch disks are 8 in. outside diameter and 6 in. internal diameter, giving a projected area per disk of 22 sq. in. There are eight frictional surfaces, giving a total of 176 sq. in. Wear on the surfaces is automatically taken up by the springs.

The transmission gearset is a selective sliding gear type providing three speeds forward and one reverse. The tooth surfaces are all given a ground finish and are held to extremely close limits of accuracy. The reductions in the transmission gearset are 3.35 to 1 on first speed; 1.75 to 1 on second; direct on third and 4.18 to 1 on reverse. The transmission driving shaft is mounted on a roller bearing at the front end and on a two-row ball bearing at the rear end. The countershaft is mounted on two roller bearings. The speedometer shaft is driven by a pair of spiral gears installed at the rear end of the transmission shaft.

The drive passes to the rear axle through a tubular propeller shaft fitted with two metal type universal joints. Over the front joint mounted on the rear end of the transmission gearset is a metal shield to prevent grease from reaching the bottom of the floor board, even in the case of an accidental leakage of grease from the universal joint housing.

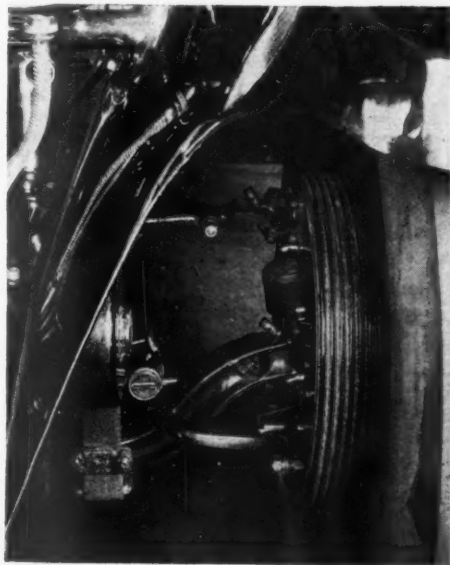
The rear axle is a semi-floating type with a pressed steel housing. Part of the torque of the rear axle is taken by a pressed steel torque arm and part by the rear springs. Driving thrust is taken through the rear springs. The pinion shaft is mounted on adjustable taper roller bearings and the rear axle shafts are mounted on single row ball bearings. The roller bearings have greater thrust capacity, intended to reduce the amount of wear, while their smaller axial component, giving a further reduction, provides a two-fold effect on the end play of the pinion shaft, resulting in a longer maintenance of gear adjustment.

In this axle, an improvement has been made in the differential bearing mounting. In order to eliminate the distortion of the bearing shell, which often occurs when the differential bearing outer race is clamped into place, the outer race of the differential bearings are, pressed into the differential housing, while the bearing cones are mounted on adjustable sleeves, which fit reamed cylindrical seats in the differential car-

rier. This method is intended to eliminate any clamping, although the races are well supported to hold the true shape. The standard rear axle ratio is $4\frac{1}{2}$ to 1.

The disk wheels are designed for 33 by $4\frac{1}{2}$ in. tires. The spare wheel is mounted on a carrier bolted rigidly to the frame rear cross member and cross tube. This carrier is a hub clamping type without straps or shoes. The spare wheel is clamped between the carrier and a screw cover operated by a convenient T type handle in which is fitted a barrel type lock.

The brakes which operate on the four



Front inside view of brake installation on front wheel. The method of connecting the steering arm is clearly shown

wheels simultaneously are of the mechanically operated, internal-expanding shoe type. The brake shoes are cast aluminum faced with wire woven asbestos. When pressure is exerted on the pedal the motion is transmitted to a crank through a planetary gearset which steps up the motion of the pedal. The ratio is such that the crank to which the planetary gear delivers the motion is made to move through 90 deg. for a 26 deg. movement of the pedal. The crank is so positioned that the motion at the start is rapid, giving low mechanical advantage. As the action

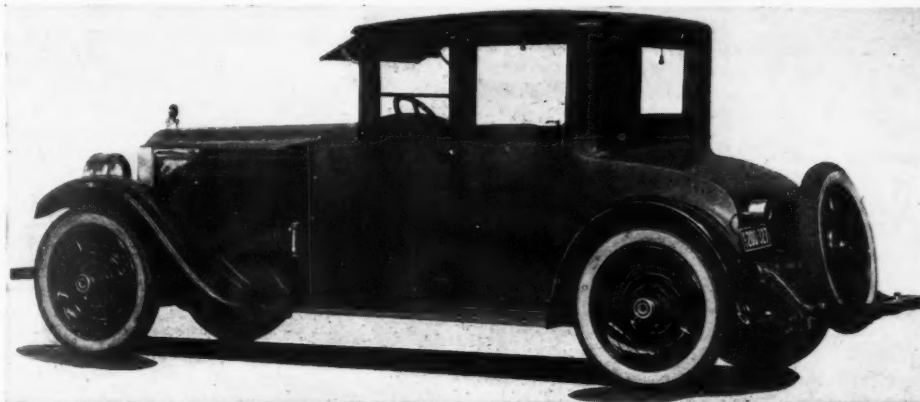
progresses, the motion progressively slows up with inversely progressive increase in mechanical advantage.

The pull cable for the brakes is attached to the crank. The pull cable passes from the crank over a pulley which is supported on the end of a lever fastened to the rear brake equalizing shaft and terminates at the end of a lever which is supported and anchored to the front brake equalizer shaft. As the pedal is moved, this cable is pulled, tending to rotate both equalizer shafts. The cable for the front wheel brakes is pulled by levers on the front equalizer shaft and the rear wheel brakes are actuated by the pull from levers on the rear equalizer shaft. The cable for the front wheel brakes is thus separate from the cable which operates the rear wheel brakes.

The front brake cable is a single line, one extremity being at the left front wheel brake camshaft lever and the other at the right front wheel brake camshaft lever. The pull from the brake mechanism is self-equalized between the two front wheel brakes by this cable, which passes over pulleys and through the equalizer shaft or cross tube. For operating the rear brakes, a similar cable equalizing device is used, except that the cable ends are attached to loose intermediate levers on the rear equalizer shaft or cross tube and connected to the rear brakes by solid rods.

As the pedal is depressed, both the front and rear equalizer shafts are rotated, pulling the respective cables which pass through the equalizing pulleys, consequently not only equalizing the pull to the front and rear wheel brakes, but also to the individual left and right brakes at the front and rear. The front wheel brake cables terminating at the front brake camshaft levers when pulled, actuate the brake camshaft and apply the brakes. At its inner end the front brake camshaft is provided with a sliding joint and at its outer end a universal to take care of the movement of the wheel in steering and any other relative movements between the wheel and chassis.

The hand brake lever operates the same rear brakes as are used in the pedal system, through the same rods from the rear cross shaft. When the hand lever is pulled it rotates the cross shaft and with it rigidly attached arms



Packard four-passenger coupe. This illustration shows the manner of carrying the spare wheel

which pick up the loose levers attached to the rear brake pull rods. When the foot brake is applied these arms remain stationary and the loose levers are pulled away by the foot brake cable mechanism. When the hand brake is applied, the arms are pulled, picking up the levers and applying the rear wheel brakes independently of the front wheels. All four brake drums are drop-forged from high carbon steel with ground finish on the engaging surfaces.

The front axle is designed to perform the two functions of acting as a carrying member and also to take care of the steering and the front wheel brake torque. The steering knuckle pin in this axle is inclined so that the center line produced would intersect the center of tire contact with the ground. The steering knuckle pin is mounted top and bottom on ball bearings, the upper bearings having two rows of balls and taking only radial loads. The lower bearing, in addition to the radial load, takes the downward thrust of the weight on the front wheels. The front wheels are mounted on tapered roller bearings which fit into tapered races in the wheel hub core. The front wheels have a toe-in of $\frac{1}{2}$ in. The steering gear is a worm and nut type.

The spring suspension is semi-elliptic, the front springs being 38 in. long and 2 in. wide, shackled at the rear end by a compression shackle with the bolts ex-

tending through the frame. The rear springs which take the drive are semi-elliptic 54 in. long and $2\frac{1}{4}$ in. wide and are shackled at the rear end. Both front and rear springs are parallel to the tapered frame and mounted to it. Watson Stabilator shock absorbers are fitted front and rear. The frame is a channel section with side members 8 in. deep and $\frac{1}{2}$ in. thick. The frame is tapered from the front and rear end so that offsets are eliminated. Rigid fittings are provided at each end to which cross tubes are riv-

Body	Wheelbase	Price
5-pass. touring.....	136	\$3,650
4-pass. runabout	136	3,850
5-pass. sedan	136	4,650
5-pass. sedan limousine.....	136	4,700
4-pass. coupe	136	4,550
5-pass. coupe	136	4,725
Chassis	136	3,350
7-pass. touring	143	3,850
7-pass. sedan	143	4,000
7-pass. sedan limousine.....	143	4,050
Chassis	143	3,450

eted in place, acting as stiffeners and at the same time, providing special mountings for bumpers which are supplied as standard equipment. Chassis lubrication is taken care of by a pressure grease system, all grease cups having been eliminated.

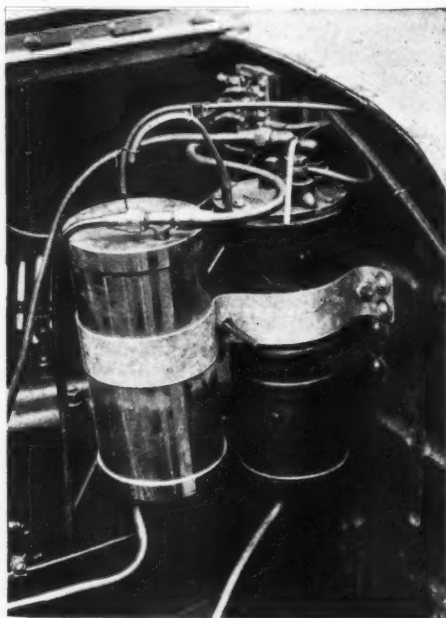
In mounting the muffler to the frame, particular attention has been given to rigidity so as to assist in silencing the exhaust. Heavy brackets are employed

and the muffler in turn acts as a support for the exhaust pipe end entering the muffler. The front muffler joint is of the gland type packed with asbestos rope; the rear muffler connection is a flange joint, the flange being pinned and brazed to the tail pipe. The muffler itself is of rigid construction.

The 136 in. wheelbase chassis weighs 3170 lb. and the 143 in. 3220 lb. The five-passenger touring on the 136 in. wheelbase chassis weighs 3870 lb. The seven-passenger touring on the 143 in. chassis weighs 4020 lb. The open car body and door panels are finished in dust-proof grey striped with vermilion. Bonnet molding and top body moulding are black. The wheels are dust-proof grey striped with vermilion and black. The bonnets are dust-proof grey with the louvre striped with vermilion. All of the other parts are black, with the metal parts nickel plated.

The closed cars are Packard blue striped with twentieth century red, medium, with black moldings. The upper body and the body front is of black and the wheels are blue striped with medium red. The bonnets are blue with red striping on the louvres. All other parts are black with the exception of the metal parts, which are nickel plated. The open cars are trimmed in Spanish leather and the closed cars in button tufted upholstery cloth.

Emergency Tank for Use with Vacuum Tank



AN emergency gasoline tank to be mounted under the hood in connection with the vacuum tank has been brought out by the Skaggs Automotive Equipment Co., Canton, Ohio. The tank is so arranged that as the gasoline is sucked in through the main line to the vacuum tank there is a portion of the gasoline that flows down into the Skaggs emergency tank and continues to do so until the emergency tank is full. When it is desired to operate the emergency

gas tank, a choke on the dash is pulled, allowing the gasoline to flow from the emergency tank to the carburetor by gravity. To refill the emergency tank it is only necessary to put the choke in original position and the flow into the emergency tank will be continuous until the tank is full.

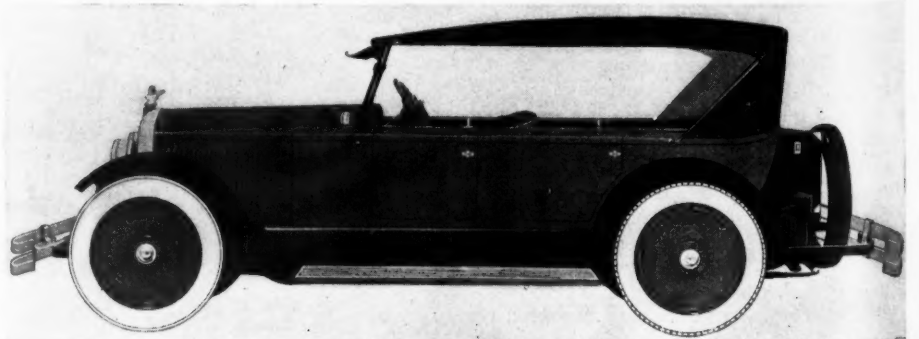
The Skaggs tank is equipped with a sediment trap in the bottom and is provided with a drain plug for cleaning out the sediment and water, which falls down into the emergency tank instead of passing over into the vacuum tank.

Earl Sport Phaeton Fully Equipped

FINISHED in an ultra marine blue and selling completely equipped for \$1,275 f. o. b. factory. The Earl sport phaeton offers to the public a five-passenger car which is intended to make a direct appeal to those who want a car of this type.

The seating arrangement has been worked out to afford comfort as will be realized from the dimensions: Length, front tonneau 53 in., rear tonneau 49 in.; width, front seat 39 in., rear seat 45 in.; depth, front seat $17\frac{1}{2}$ in., rear seat $20\frac{1}{2}$ in.; pitch of front and rear seats $3\frac{1}{2}$ in.; steering wheel to seat cushion 9 in.; side rails 10 in. above front seat, 9 in. above rear.

As to the equipment the following is included: Full five-passenger model; all-nickel headlights with dimmers and non-glare lenses, cowl parking lights, signal tail lights, hooded light on instrument board, special light under hood, oil pressure gage on dash, speedometer, ammeter, Sparton horn, two windshield wipers, moto-meter and ornamental radiator cap, foot rest in tonneau, aluminum-covered running boards, double bar bumpers front and rear, disc wheels with demountable rims, spare tire, tube and cover, sun visor, trunk, curtains carried in pocket back of front seat.



The Earl Sport Phaeton, \$1275

Autocar Adds Electric Truck to Its Line

One and Two-Ton Models to Be Made. Electric Trucks Are Similar to Gasoline Models as Regards Axles and Other Units. Motor Support Also Acts as Front Battery Support

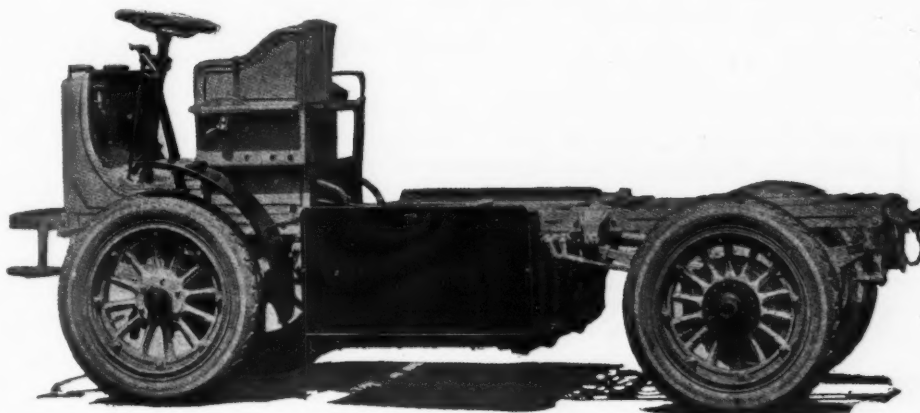
ELECTRIC trucks in one and two-ton capacities are now being manufactured by the Autocar Co., Ardmore, Pa. The smaller size lists at \$2,000 and the larger at \$2,200. With the exception of changes made necessary by the substitution of electric for gasoline power, the electric trucks are similar in design and construction to the gasoline trucks manufactured by this company. The prices given are for the chassis complete with dash, seats and fenders.

The axles are identical with those used in the gas truck. This is also true of the brakes and springs. The driving motor is a straight series type and is located under the driver's seat. It is supported by a heavy cross member which also acts as the front support for the battery.

The drive to the rear axle is through a two-piece propeller shaft which is fitted with three universals. The universal at the forward end of the propeller shaft is of the fabric type. The forward portion of the propeller shaft extends across the space taken up by the gearset in the gas truck. At its rear end this portion is supported in a self-aligning ball bearing which is carried by a cross member. The rear portion of the propeller shaft has metallic universals at either end.

The speed of the truck is controlled by a handle at the left of the driver. This handle operates a drum type controller which together with the resistances, is located under the seat. The controller gives five speeds forward and two in reverse. In an emergency, the motor may be used for braking. The handle operating the charging-running switch is mounted on the steering column just under and ahead of the steering wheel. This handle may be removed when in the off position and it is intended that the driver will remove it when he leaves the truck. The ampere hour meter is mounted on the dash and the shunt circuit breaker may also be mounted there if desired. This device opens the charging circuit when the charge is complete. The lighting switch and fuse box are on the center of the dash.

The battery is slung underneath the frame in the space between the rear hangers of the front springs and the front hangers of the rear springs. The battery trays are carried on an angle iron platform which is supported by inclined links which are attached to frame cross members at their upper ends. These links are braced against lateral movement. A spring link extends from the center of the front of the battery platform upward and backward to the cross member supporting the center



The Autocar electric truck

of the propeller shaft. The battery is divided into two parts, one on each side of the propeller shaft. With this construction, some longitudinal motion of the battery against the spring link is possible. It is believed that damage to the battery from road shock will be materially reduced in this way.

The battery trays are carried on a single master tray which slides in and out readily. When the master tray is in the out position, all the batteries are in an accessible position. It is not necessary to break any electrical connections to move the trays out. The doors on the battery boxes serve as locks for the sliding trays.

The location of the motor and controller not only minimizes the amount of wiring but also makes both units readily accessible for inspection and maintenance. All necessary inspection work can be performed with one tool, a 5/16 cap screw socket wrench. This wrench

will release the controller H-plate so that the controller can be turned up into plain sight and within easy reach. It will remove or tighten up all the connector lugs on the controller and running switch. It may also be used to remove the floor boards and cover plates, and to remove or adjust the controller fingers. All wires are run in the open and held with clips and, with the exception of the tail light, there is no wiring back of the seat. The top of the battery box is waterproof.

These trucks are built in two wheelbase lengths—97 and 120 in. The overall length with the short wheelbase is 156 in., and the length back of the seat is 98 in. On the long wheelbase models, these dimensions are 179 in. and 121 in. respectively. The weight of the chassis complete with the exception of the battery is about 4000 lbs. The operating voltage is 85 when equipped with lead battery.

CAR LINES MAY USE BUSES

AUSTIN, Texas, June 11—Governor Pat M. Neff has signed the bill which permits street car lines and motor bus lines to be operated by the same company. It goes into effect June 14. It is stated that a number of street railway companies will take advantage of the new law and place motor buses in operation in connection with their street cars.

SEES GREAT EXPORT BUSINESS

WASHINGTON, June 9—Predictions have been made by M. H. Hoepf, chief of the automotive division, Department of Commerce, that the time is close at hand when the export sales of cars and trucks will amount to 10 per cent of the total production. He believes that with the development of sales organizations abroad the export business will ultimately reach the 25 per cent mark.

Decree to be Published on 10 per cent Alcohol Mixture

PARIS, May 26—(By mail)—Within a few days decrees will have to be published covering the application of the recent law by which 10 per cent state alcohol must be mixed with all gasoline put on sale in France. The decrees will have to fix the selling price of the alcohol, the manner in which it shall be mixed with gasoline, and the guarantees to be given to the public.

The prospect of being obliged to make use of a gasoline-alcohol mixture, erroneously denominated National Fuel, for only the 10 per cent alcohol is produced in France, is far from meeting with general approval, and on technical, economical and political grounds the project is being very seriously criticised.

Here the Salesmen Own and Operate the Used Car Company

Ford Dealer Has Found This Method Interests the Salesmen in Proper Trades and Maintains Ethics

THE National Automobile Dealers' Association is putting into bulletin form some exceptional experiences of member-dealers with used cars. After explaining the various tests made by the Association to assure that the plans are actually operative, the most recent bulletin says:

"One of the plans which came under the headquarters observation some weeks ago, was that in use by The B. P. Higby Company, Ford dealers in Youngstown, Ohio. Attention was attracted to it by the statement of the Higby Company that it 'does not own a used car department.' Investigation followed. The detailed report, as made by Beecher P. Higby, president of the company, makes up this bulletin.

"It is interesting to note that Mr. Higby is a veteran in the Ford field. He has been one of the staunch charter members of the Youngstown Automobile Dealers' association and was president of that group in 1922. The report he makes follows:

"Twenty months ago I was going through the same experience with used cars and new car salesmen that every other automobile dealer has had to contend with, and with which most of them still are confronted.

"That is:—The interest of a salesman, in a used car, while selling it to the Boss, and his lack of interest after he has accomplished that sale.

"And:—I was doing some criticizing of my salesmen one morning when they came back at me with the statement that I was not handling my used car department properly.

"We, as a company, were perfectly satisfied, as we had always made a fair profit for the year on our used car department. So I made a proposition to sell my used car department to my salesmen. They, knowing in a general way, of our success in previous years, took me up.

"They bought my used car department for \$5,200 paying me cash, part of which they borrowed from the bank. They pay the company \$100 a month rent, which includes storage and office space. All expenses are theirs. And all profits are theirs. They recondition all cars and service all used cars after they are sold. Their organization is a partnership, with my sales-manager as the manager, and

he is also in the partnership of the used car company.

"No profit has been divided among partners, and will not be until they have accumulated a surplus in cash or stock on hand, of \$2500, and all bills or indebtedness paid. But all salesmen are partners in the Used Car company and they draw 4 per cent commission on used car sales which they individually make.

"When this Used Car Company was started, I employed 00 salesmen and all were partners of the Used Car Company, 00 have left our employe and one was bought out because of unfair dealing and unwillingness to cooperate in the fullest sense. We have employed 000 new salesmen and one of them has been taken into the partnership. The others probably will be taken in if they prove up to the standard.

"The Used Car Company in twenty months has accumulated about \$2000 in surplus stock on hand and owes less than \$2000 at their bank.

"Your last two questions are of the greatest importance, and I will say that this plan in my estimation has worked out very well, not only to the company benefit but to the customers and the salesmen. I will answer both questions by several statements which I think are entirely true.

"(1) A salesman of automobiles is interested in new car sales but if he were not responsibly interested in

the Used Car Company, he would not be vitally interested in the sale of used cars, or the used car purchaser, which is the condition existing in 90 out of 100 cases.

"(2) Being vitally and financially interested in the Used Car Company makes a salesman work for a trade-in at a sensible figure, and one which he can turn at a profit. Today I think 50 to 70 per cent of automobile deals take a trade, and the salesman must treat the used car purchaser right, and jealously guard the used car reputation.

"(3) They must fuse the first and second principles together to make both ends meet, and that benefits us.

"To sell a volume of business at the present time, the salesmen must trade. In turn they must sell the used cars profitably in order to provide a net profit, and also to make possible additional trades and new car sales. To keep the volume going they must sell right to deliver satisfaction to the used car purchaser.

"For the last twenty months I believe that, as automobile dealers, we have beaten the used car question. I believe that it has been and always will be an individual dealer question. The question arose from lack of attention and ability on the part of the dealer and his salesmen. They did not meet the issue frankly. They were too much interested in new cars.

DAW'S DIARY

JUNE 8—Gee I had a funny job yesterday and I am glad the boss was away becuz if he had a been there i wouldnt of had the job any moren a rabbit.



AW ZHUK? THIS DONT LOOK NOTHING LIKE THAT DAME—THEM EYE? & THAT VOICE! GOODNITE!

I just came back from dinner which was luck cuz i wasn't all grease wen in prances the swellest doll you ever laid eyes on, her saying she was havin the most ter-r-ribble time with her car cuz it wouldn't be-have a tall, me tryin to feel sorry for her and trying not to let on i was

tickled pink becuz i would halfta go out with her and find out wots the mater.

When we went out i figured i would let her drive sos i could see how she did it. She didn't seem to know wot was the mater except that every onct in a while the motor would stop and then after a while it would start and go just as if nothing was the matter.

I ast her a lot of fool questions on the way over to whare her car was stawled just to hear her tawk. She sure had the swellest voice i ever heard. I wonder what made me be agreasehound when i could of a bin a lawier or a shofer or a auto salesman and plaid around with people like her which is well edicated and refined and dont like to get their hands durty which is wot i am best at and puts me in another class.

Some Things the Tire Manufacturer Can Do to Improve Tire Merchandising

In This Article Are Mentioned Some Features of the Trade That Are Not 99 Per Cent Satisfactory. Dealer Helps, for Instance

By CLYDE JENNINGS

Fourth Article

LAST week we told of some things the manufacturers have done which contribute to better conditions in the tire merchandising field. It looked like considerable accomplishment, and it has been. But there is much more to do.

This year the total sales of tires at the factories will amount to about 45,000,000 tires. Of these about 32,000,000 will be handled by the dealers, branches and other tire mercantile establishments. Just how many of them will reach the retail dealer we cannot say, and right here is one place the tire manufacturer can help.

There are entirely too many tires reaching the consumer at wholesale prices. Too much leeway has been given to the factory salesman, branch manager, wholesaler and others connected with the jobbing trade, to sell tires that will reach the consumer.

Since the last meeting of the National Dealers' Association last year considerable progress has been made in persuading tire manufacturers to restrict their sales to car manufacturers to four tires per car of factory production. This is not always possible, as factory production is variable but there is every reason to believe that the tire manufacturers are much in earnest in seeking to restrict sales to car manufacturers.

Where this is done, it opens the way for the car dealers to make a sale when the car sale is completed. Some of the most successful car dealers are practically refusing to sell a car that is not equipped with a spare tire, bumpers and other needed merchandise. These successful merchants make no pretense that they are selling this fifth tire at cost, or anything of that kind. They make the right sort of a profit on it. It is only the foolish merchant that throws in a tire. When he does he is violating all of the ethics of motor car selling.

Restrict Distribution

Another point on which the factories can give much assistance in maintaining a decent standard of merchandising is in restricting distribution to proper hands. Recently MOTOR AGE made a survey of Jefferson County, Ill., to learn in what sort of places automotive merchandise was sold. That part of the report that deals with tires brings out this list of tire dealers in that county:

Exclusive Tire Store.....	1	Hardware stores.....	3
Accessory stores.....	2	Grocery & Restaurant.....	1
Car Agencies.....	7	Lumber Co.....	1
Garages.....	9	Ice, Coal & Livery.....	1
Vulcanizing Station.....	1	Drygoods.....	1

There is no fault to be found with the five classifications at the left, but it would be rather difficult for a manufacturer to defend most of the five classifications printed on the right. It can be said however, that the hardware store is selling a private brand tire made for a reputable wholesale hardware house and marketed in large quantities by this hardware jobber through retail hardware houses and, strange

The first three articles of this series were published as follows:

May 24—Now Is the Time to Add Tires to Your Transportation Store.

May 31—Tire Sales Not "Small Change," Totals Run Large.

June 7—What Tire Makers Are Doing to Make Tire Selling a Better Business.

as it may seem, through some exclusive tire establishments. Even some car dealers handle this private brand tire rather than an established tire. Some merchants have queer ways and there is a deal of education before this industry.

A representative of MOTOR AGE asked the lumber company and the ice and coal man why they handled tires. Their answers were the same.

Each said that he used several trucks and he found that by taking the agency for a tire he could get tires for his

trucks cheaper than at retail and also if they offered tires for sale, somebody would come along once in a while and buy a tire or two. These dealers keep a few Ford sizes in stock and make quite a number of sales. Their total equipment for service consists of a hand air pump.

The restaurant man just went in on a venture that he might make something out of it and the drygoods store had the same idea. Prices in this community are badly shot and no one of the 27 dealers thinks of quoting list prices, even to a stranger.

All of these 27 dealers talk a good deal about the mail order competition. Some of this mail order competition is the queer sort but most of it is with the legitimate mail order houses, those which are in business to stay and which give adjustments when tires clearly go wrong. We are not blaming the tire manufacturer for this competition, except in this, if there were fewer tire selling places in Jefferson county, there would be a better chance for dealers to equip themselves to properly sell and service tires, and they would be in better position to meet this mail order competition.

There is but one weapon to meet the mail order house that sells quality goods, and that is service. The dealer who cannot sell enough tires to make him think that there is a possibility of succeeding in this line of business, will not so equip himself. He will not study the tire problem so that he can understand it well enough to give service himself. As a result, his sales are of no more satisfaction to the car owner than that of the mail order house.

He has no argument whatever, except quality and few of these restaurant keepers and icemen know how to talk quality of tires. There are a few more than 2500 automotive vehicles registered in Jefferson County, a few less than 100 per tire dealer. Some of the dealers estimated that one-half of the tires came from the mail order houses, at least for the farm owned machines. The only hope for a county like this is to build up a few good dealers, with proper equipment and with a sufficient understanding of the business. More than a dozen tire manufacturers and four private brands are sharing in the business in this county and none apparently has a satisfactory account.

It would appear that it is time for some manufacturers to wipe some of this unprofitable territory off of the sales map and let someone else develop it.

Dealer Helps

It had always been our thought that the tire companies were

very liberal in preparing dealer helps for their dealers. Much to our surprise last week a representative went to nine dealer appointing agencies for tire manufacturing companies, in Chicago, and found that at only one of these, was there a supply of helps available for the newly appointed dealer.

One Chicago representative of a growing tire manufacturing company said something like this:

"We are simply the factory branch here, and never thought that it might be a good idea to have some advertising material for the dealer because so much money is spent for his benefit in general campaigns—these always seem to do the work."

Think of it. A man comes into this office, is signed as a dealer, a stock is sold to him and he goes home without anything to send out to his friends, telling them that he has taken on this line of tires.

Another branch which has the task of signing dealers said that the dealer would have to send to the factory to get advertising for distribution. The dealer must order it.

Some of the other factories made suggestions to dealers and some of them printed letterheads for the dealers, but only one of the nine visited had at hand advertising to hand to this dealer who might be enthusiastic over the new merchandising proposition.

It is not the intent here to go into the question of quality of the dealer helps. Some of them are very excellent samples of counter advertising. Some are not so good. It may or not be the fault of the manufacturer, but the more you talk with tire dealers, even the exclusive dealers, it is amazing how little they know about tires and what may be expected of tires. This, of course, does not apply to all dealers, for we have found many of them who appear to know the business from the beginning.

Several of the factories conduct schools in which tire repairing and adjustment is taught, and some of these graduates are the worst salesmen we have seen. One exceedingly poor salesman but expert repair man told the writer a week ago that when he went to a factory school they did not say a word during his course about selling. The results are apparent.

A woman car owner asked five tire men how much pressure she should put in her tires. She got four different answers in pounds. She was driving a car little known in that community and not a single one of the tire men asked her the weight of the car. As a matter of fact, none of the answers appeared to be based upon any relation of the car and the tire, but just an arbitrary answer. All but one of the pressure figures were higher than the figures given in last week's *Motor Age* on authority of the tire experts.

So we would suggest that tire manufacturers take a little more care in the education of their dealers and that they supply them with more selling helps.

Self Competition

One of the greatest evils of the tire business has been the competition between the same line of tires in the hands of the everyday, hardworking tire merchant and the "fire sale," or bargain house. It would be painful to recount here the grief stories that have been told us by men who are trying to make a living selling a certain make of tire, only to find at the peak of their season that the same tire was offered at below the dealer's cost by a department store, a bargain house of some kind, or one of the fly-by-night merchants who rents a store-room and leaves the "for rent" sign up.

Everybody in the trade knows how these things happen, except the sales department of the factory that sold the tires. You can always bank on the sales department not knowing. They blame it onto some one in "New York" or some other place "where we have no retail stores." It would appear to the casual observer that after while, the sales department of tire manufacturers would begin to know the gyp dealer who will not keep his word by sight. Certainly he should be familiar by this time.

One tire company made very remarkable strides in merchan-

dising last year; so great, in fact, that tire men are apt to talk about this company. The salesmanager of this company says that much of the success is due to the fact that he never competes with any of his dealers. When he has any seconds or other bargains to offer, he always offers them to his own dealers and he says that if his dealers could not take them, he would destroy them rather than place them in other hands. Once in a while one of his dealers will double cross him and sell some of these seconds to "bargain specialists." Whenever this happens, this salesmanager traces the stock to the source, and then removes the name of the offending dealer from the list of those who receive bargain offers.

This policy has paid this company immense returns, as might be expected.

Sales to Special Accounts

An evil that has become very common in the tire field is that of selling to fleet owners and others at wholesale prices direct from the factory or branch. Such a policy always is abused. Some man will represent that he has more trucks or cars than he really has and get on the list. Next he is selling tires to his friends and not charging them a profit. One of the greatest joys of life is buying at a special rate and ranking very close to that is the joy of being able to let your friends buy something from you at a special rate.

It seems to be human nature to regard the storekeeper as a necessary evil and to freely patronize him only when you want to ask a special favor. In the tire business this has been carried to an extreme and it has taken a lot of sales from the legitimate dealer, who is called upon to supply air and service for these tires.

Every tire dealer knows of abuse of the policy to sell only to very large vehicle owners. In Jefferson County, Ill., a lumber and an ice dealer each sell tires. They are indifferent as to the profits, because they got a tire agency merely to buy tires for their small fleet of trucks. Some factories have recently stopped selling to even large fleet owners at the old prices but have arranged a plan whereby dealers may supply the large consumers at a special price. Because these sales are easily made and the large consumers require little service, the dealer is enabled to make some profit on the deal. Whatever he makes is velvet, as formerly he did not get these sales at all.

Special Brands

There are too many orphan tires on the market. In the Midwest Rubber Association meetings, this subject has been freely discussed. It has been said there and not disputed, that considerable proportion of the tire makers did not know what it cost them to make tires.

Any private brand jobber, if he tells you the truth, will tell you that he does not want a factory because he can buy tires cheaper than he can make them. These private brand tire jobbers have seen many of their suppliers fail and they could have bought the factory at a fraction of the value, but they do not buy. They know that a lot of the factories do not know what it costs them to produce, and they can buy from them at an actual loss.

Some tire factories figure that when trade is dull, it is good business to keep the factory running by manufacturing tires at a slight loss rather than to shut down. If they really knew their costs, this might be a good investment in some respects, but these factories fail to keep in mind that all of these private brands they put out are really competition for the tires that they hope to make under their own brand later.

Many a tire factory has killed its hope of a good, clean market by selling a private brand of tire to some jobbing house that goes into this factory's home territory and sells these tires cheaper than the factory can sell them.

Fictitious Prices

Fictitious price lists never did any manufacturer any good. It simply is not in the fundamentals that an overpriced article, to be sold at a discount, is a good thing in the long run. An

article that is always sold at a discount eventually loses its character. It becomes a "cut price" article. It is an "also ran." It becomes degraded.

In any of the older lines of business, any chain of stores that wants to kill a certain branded article, will get a supply of this article and sell it at a discount, even when honestly priced, because these older merchants know the result of the constant hammering of prices.

Some factories have priced their tires so that a 75 per cent discount could be given. There need be no discussion as to the result of such a policy.

Fair Prices

There must be a definite basis of value of any tire that is manufactured, if the factory is at all efficient. Tire prices should always be put on this basis and the lists made accordingly. There will always be the opportunity for a certain manufacturer to charge just a bit more because of his high class merchandising methods, because he has been able to put something over in the way of service and for other reasons.

Quality merchandising always has existed and always will. A tire can have vogue or style, just the same as other articles. But, aside from this feature, tires should be fairly priced and in the end the public will learn which are honestly priced tires. One bad feature about these fictitious prices is that there is always some dealer who "sees a customer coming" and robs him for the full amount of the list. Then he makes an enemy for himself and this brand of tire.

Discounts

Discounts should be sufficient to let the dealer make at least a pretense of making a living. Formerly the range of discounts were very bad, but the rule of reason is becoming established, the range is decreasing and the average is becoming fair to all concerned. The chief trouble now is the overpricing of tires and the too great discount. Since the larger manufacturers have raised their discounts, conditions in this regard have greatly improved.

Standard Warranty

There is now a very acceptable standard warranty. It prob-

ably will never be accepted by manufacturers 100 per cent but it should approach that. It is in this connection that dealers can help the factories very materially. If the legitimate dealers will refuse to sell tires for those companies that insist on the old mileage guarantee, they will enable the factories to better carry out this standard warranty which has been so well begun.

The better class dealers are finding that, as this standard warranty becomes understood by dealers and factory people, it is working out with full justice to the customer. The tire science is well enough established that the wear of a tire speaks for itself. All that is required is for those interested in the adjustment to know their business. And in this adjustment is where the reliable company that has a stable sales organization can reap a harvest.

It is told of a gyp jobber of private brands that he boasted of a wonderfully small adjustment percentage. He did not explain in this connection however, that the average life of one of his dealers was something less than six months, so very few of his consumers had tires long enough to demand adjustment before his dealer had changed. More than likely, he could not secure a second dealer in the same town.

Stable dealer organization and fair-to-customer adjustment go hand in hand.

Spring Dating

The investigations made by MOTOR AGE are convincing that the practice of selling tires early in the fall, delivering them in early winter and collecting for them from the dealer in early spring is a bad practice. If there ever was a justification for this practice, that time has passed. Under present conditions it is disorganizing.

But this subject is much too important and requires too much space for its proper treatment to consider it in a general article of this sort. It will be made the subject of a special article later.

Next week, Competition You May Expect in the Tire Business.

If any dealer has any questions regarding the tire business that he wants to ask, now is the time. We will do our best to supply any information wanted.

If More Manufacturers Would Practice Policies Like These the Conditions Would Improve

AS ONE travels over the country calling on a large number of Tire Merchants in the important centers, it becomes evident that those whose business is an outstanding success are merchants—

Who believe in building customers for tomorrow, instead of merely making a sale for today.

Who sell quality goods only, carefully avoiding merchandise that is built to sell on price.

Who do not attempt to confuse the customer by handling too many makes or brands. (Too much variety is a sure way to lose sales.)

Who have a price policy to the User that is not only fair, but so maintained as to insure the buyer's confidence.

Who lend no hand to the evil of price cutting, which at the best is a method of sale designed only to sell the floating type of customer.

Who recognize the value of outside sales effort, not making the mistake of depending on the customers to come to the store. Solicitation by salesmen, when carried on aggressively and systematically, is bound to produce results.

Who do not consider a sale completed when the tire is delivered to the buyer, but show their interest

in the customer by inspecting his tire equipment and wheels periodically, and making suggestions, or rendering other services.

Who use advertising effectively. It is not alone the amount of advertising that is available, but equally important is its effective use.

Who keep the store carefully arranged, clean and orderly, with attractive window displays at all times and keeping the help about the store alert and businesslike. No customer enjoys going into a store ill-kept, unclean, and conducted in a loose way.

Who support the STANDARD TIRE WARRANTY fully, as a measure that is eminently fair and helpful to manufacturer, merchant and consumer alike.

Success in the merchandising of automobile tires might well be summed up in a few words. Merchants whose policy is based on the conviction that no business can go wrong when the right fundamentals are followed—

These are the merchants who enjoy real success.

The Diamond Rubber Co., Inc.
Factories
Akron, Ohio

Mercedes Team Will Compete Next Year

Team Engineer Says Mercedes Will Return in 1924 With Chassis Better Suited for Indianapolis Track

THE three Mercedes cars that competed at Indianapolis Decoration day attracted more than the usual amount of attention. Some of the specifications of these cars that were not printed in the account of the race last week are:

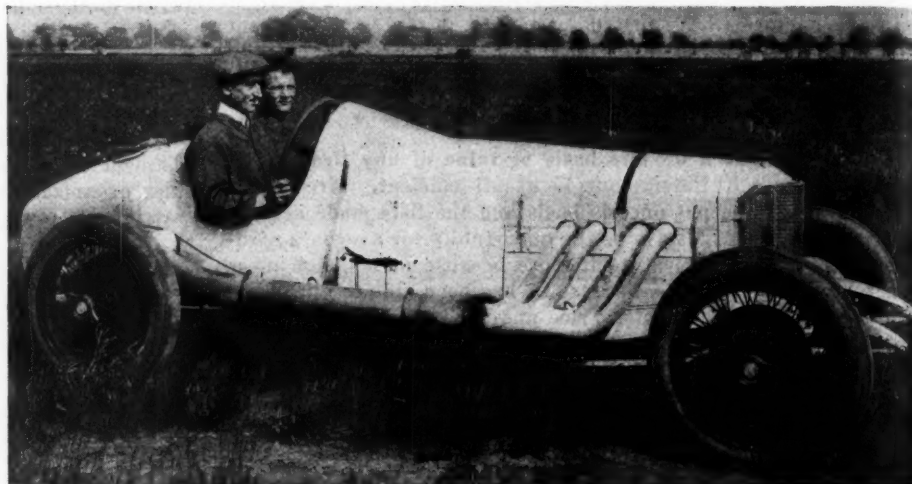
Wheelbase 107½ inches.

Tread standard.

Bore and stroke 2.756 in. x 5.02 in.

The cylinder block construction is built up from four forged steel tubes which are spaced at the proper distance from each other by webs welded at the lower end of each. The cylinder tubes are machined all over on the outside after which the one piece sheet steel water jacket is welded on to the tube assembly. The flange for bolting the cylinders to the crankcase is a separate piece that is welded to the bottoms of the four tubes after which it is machined to secure a flat surface for bolting to the crankcase gasket.

Two camshafts are carried on the top of the cylinder structure and each shaft operates two valves in each cylinder, there being two inlets and two exhausts for each. The camshafts transmit their lift to the valve through a directing acting valve mechanism which consists of an extra long valve guide and a hollow valve stem into which screws a hardened disk. The cams bear directly on these disks of which there is one for each valve and the long valve guides take the side thrust. The drive to the two camshafts is supplied by a single vertical



Christian Werner who provided the class of the Mercedes team. The factory team of Lautenschlager, Werner and Sailer are always brought to mind when Mercedes is mentioned. Max Sailer, besides being a driver, is the team engineer. His nephew, Carl Sailer, acted as relief driver.

shaft at the rear end of the engine. The gears on the upper end of this vertical shaft are of the worm type.

The solid crankshaft is carried on three roller bearings and the big ends of the connecting rods also are journaled on roller bearings. The details of the crankshaft roller bearing construction are carefully guarded and no information except that this type of bearing is used has been made public.

The pistons are of magnesium and aluminum alloy and are 70 mm. long.

Three cast iron piston rings 2 mm. wide are installed on each piston. The piston pin is anchored in the connecting rod and has its bearing in the piston bosses.

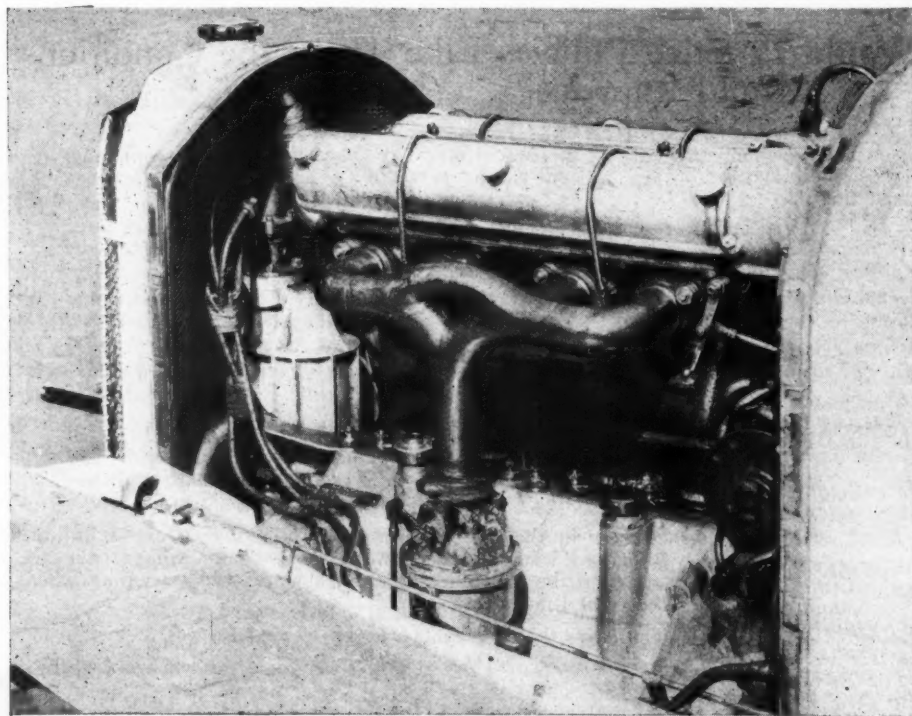
Water circulation is supplied by a centrifugal type of Mercedes pump but instead of using a packingless pump as has been done on all Mercedes engines in the past, the water pump on the 122 inch cars has a packing nut and uses regular braided pump packing. The lubrication of the engine is by force feed to crankshaft and camshafts, the pressure being supplied by a gear type oil pump located in the crankcase and driven off the crankshaft.

The fuel feed is by air pressure to the Mercedes carburetor and supercharger. The compression ratio on these engines is lower than any of the other American or foreign cars due to the use of the supercharger.

Single ignition is supplied by a Robert Bosch magneto using a single spark plug located over the center of each piston.

The Mercedes were the only cars in the race equipped with a cone clutch which has been a Mercedes feature for years. Just behind the clutch is located the cross member of the frame that supports the yoke of the torque tube. The single universal in the rear drive assembly is located at the front end of the driveshaft and this joint is a metal type of Mercedes manufacture. The rear axle of these cars is considerably heavier than either the Millers, Duesenberg or Packards, the housing of banjo shape and forged construction being the heaviest item of the assembly. The differential and pinion are carried on ball bearings and a straight bevel pinion of 3½ to 1 ratio are features of the final drive.

The front and rear springs are of the same length 38 in. long and both are of the ½ elliptic type shackled at both ends.



The exterior view of the Mercedes engine, which has roller bearing crankshaft and connecting rods. The cylinder assembly is built up and welding is used extensively in its construction

Motor Age, Visitors and Letters

WE want to call the attention of MOTOR AGE readers to a forthcoming series of articles on the flat rate by Paul Dumas. This series is going to be different from anything that has heretofore been printed on this subject. The first article will be printed within the next few weeks. The objective in these articles is to explain the fundamentals of the flat rate; how a flat rate is constructed and what enters into the necessary charges.

We believe that in these articles sufficient information will be given for the maintenance shops to compile for themselves flat rates that will be applicable to practically all makes of cars.

We believe that Dumas will convince the reader that there is very little mystery in the flat rate; but certain fundamentals must be observed, and once these are in hand a shop proprietor will have very little trouble in making for himself a program whereby he can sell his service to the car-owner at a profitable rate.

Tire Articles Create Interest

THE tire articles now running in MOTOR AGE appear to be creating a great deal of interest. We have never believed that the staff of MOTOR AGE knows all there is to know about any one thing. The substance that goes into these tire articles has been obtained by careful inquiry and investigation. We are covering as many points as we can, but we have not been able to see all the tire dealers nor all the tire manufacturers. We assure the readers of MOTOR AGE that we are open to suggestions, and would be glad to receive the views of these readers.

"The Salesman and His Future"

THE following letter is sufficiently explanatory in itself. It shows why some earnest salesmen do not stick. It was written on the letter head of a dealer in a popular car in a fair sized Texas city. Perhaps the correspondent in the service department of the factory thought it was his full duty to sell parts:

Editor MOTOR AGE:

I want to congratulate you on the recent article by Clyde Jennings, "The Salesman and His Future." I believe that this can be read with profit by every dealer, distributor and manufacturer.

Now I am going to tell you the experience that I have had as a salesman. For the last seven years I have been selling one of the well known cars, but I have now arrived at the conclusion that the future holds nothing for me with

this car and I have decided to change. This decision was brought about primarily by the attitude of superiority which the service division of this factory has assumed when I have sought enlightenment respecting the car I am representing.

When I first undertook the work, I was informed that the particular type of axle used in the car was of decided advantage to cars of certain weight and length. I quite naturally wanted to know what these advantages were and how the axle received its name, so I wrote to the factory asking for detailed information. The reply stated that the information originally given was incorrect and that the advantages were purely "manufacturing." I followed this up with a letter to the effect that I would disregard the first information and repeated my question as to how the axle obtained its name.

This persistence must have irritated the service division, the answer in substance being that they had been under the impression that they were communicating with some one who was a salesman; that if I wished any further information I could communicate with a branch or distributor, who probably would take care of me; that it was quite evident from the tone of my correspondence that I had had no sales experience.

That was when I made up my mind to get into something other than the retail selling of automobiles for that particular organization.

I am one of many retail automobile salesmen who are plugging for an existence and making a good living. I know that if sickness or adversity hits me I am dependent upon what I may have saved. There is no pension or easy chair for us when our working days are over, and there is no part of the personnel that is of more importance to the manufacturing organization than its retail salesmen.

Yours very truly,
A Texas Reader.

A South Australia Caller

A RECENT caller in the MOTOR AGE office was A. J. Goodes, director of service for the Waymouth Motor Co., Ltd., Adelaide, South Australia.

Goodes was on his way to the Dodge factory and stopped in Chicago with a special view of interviewing Tom Wilder of the Architectural department regarding a new building his company is erecting and which has been the subject of some correspondence between the Waymouth company and Wilder.

The Waymouth company sells Dodge cars in Adelaide and have been successful over a period of years. They expect that this year sales will run in the neighborhood of 600 cars. They buy only the Dodge Bros. chassis and the bodies are built in an efficient factory in Adelaide. Goodes says they sell very few of the black bodies and that ivory white is one of the favorite finishes. Despite the 3000 of Dodge Bros. cars on the streets and highways in that section, there is no similarity in their appearance.

After 50 Years

Tallapoosa, Ga., April 23rd.

Editor MOTOR AGE:

I see some references to the excessive number of failures in this line and to discount given. Now I want to state some facts after fifty years' business.

1st. There are few lines of business outside the auto line where the dealer does not set his prices and control his profit. But in this business the manufacturer dictates the price of everything. There is no retail business that is operated on less than 25 per cent. gross profit, and in many cases the profit is much more. Few lines of business cost as much per dollar to run. In any other line a dealer does not extend a large credit to any one man, and if he meets with a loss it is small per capita, while in this business you have to give credit on two-thirds of the sales nine times out of ten, and endorse the paper if you sell it, which means that if you meet with a loss, and you do frequently in this line, it is bound to be a heavy loss.

Next in this line you have to pay cash for a car before you get it, while in any other line you get from thirty to ninety days' credit and do business on the other fellow's money that long. In this line you get 18 per cent. discount from the factory price of a car, or about 16 per cent on the delivery price, or 16 per cent against the 25 per cent of people in other lines of business.

Then in this line your customer is taught to expect from \$50 to \$100 worth of work on the car for nothing under the name of service. In four out of five deals you have to trade in some old car, and work it over and resell it—generally at a loss, and sometimes at a loss of your whole profit.

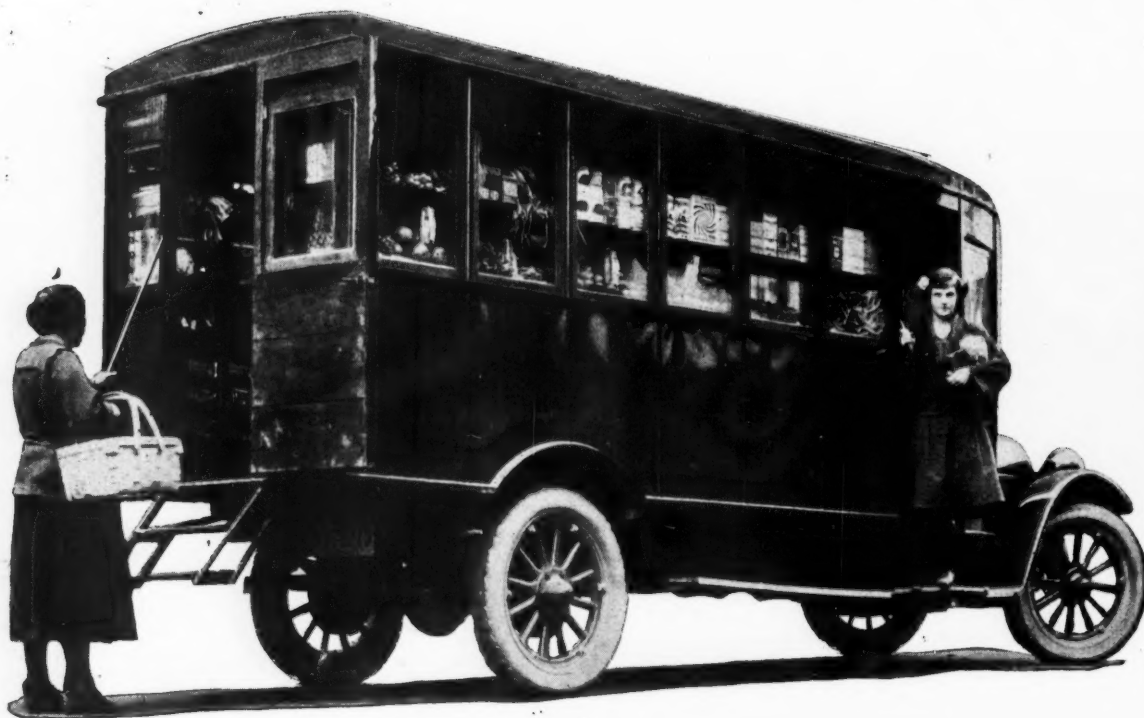
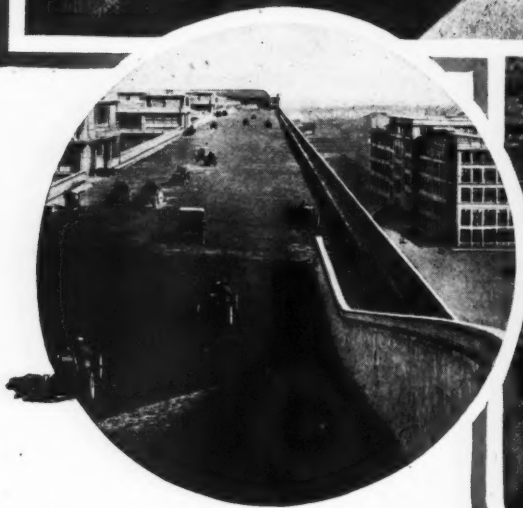
Can you see now why nine-tenths of the dealers fail. I have not failed, and won't, but I have paid \$10,000 for my experience in the last four years. If you want to use any of these facts do so. If you want me to vouch for them I will.

Yours very truly,
(Signed) M. A. GREENE.

MOTOR AGE'S PICTURE PAGES



It has been the practice of European automobile factories to test all chassis on the road. When the new Fiat factory, at Lingotto, near Turin, was laid out, it was decided to change this practice and a banked testing track was built on the roof of the factory. At the left can be seen one of the banked turns while just below it is a view showing the passage from the shops, which is under the banking at the right

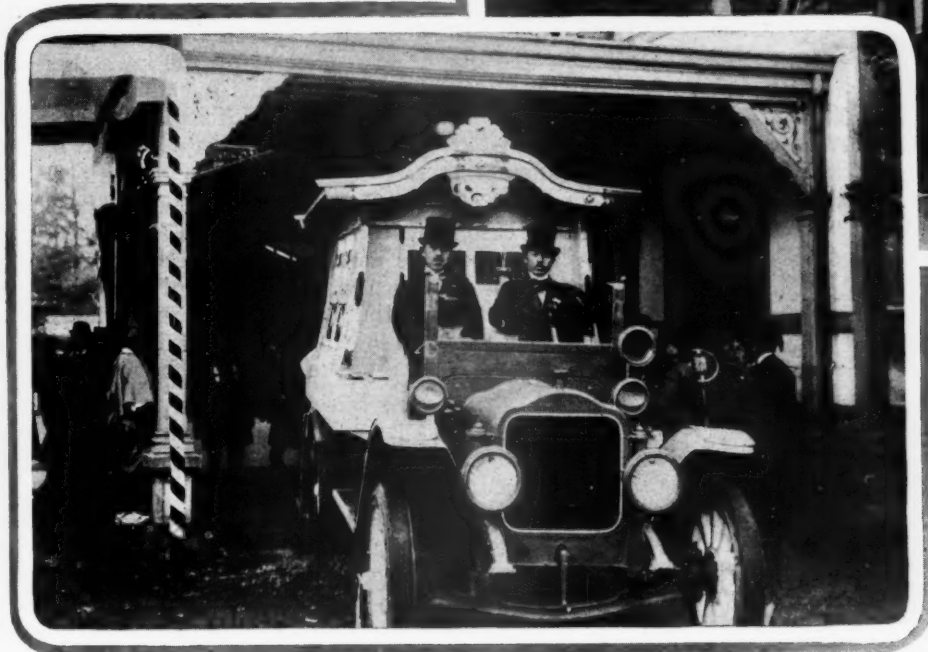


This grocery store on wheels is the successful idea of Joseph Neuman, of Cincinnati, Ohio. The store goes to the customers, who enter at the rear, select their purchases, pay the driver-clerk and leave at the front. Special orders are taken for next day delivery and a two per cent discount is allowed because of low operating costs

OF AUTOMOTIVE INTEREST



One of the old hand-drawn funeral carriages, at the right, which are still used by the poorer classes in Japan. They are preceded and followed by tom tom drums and shrill reed flutes



The wealthier Japanese have discarded the ancient funeral carriages for automobiles, like the one at the left. The bodies of these cars are of typical oriental design



Traffic control devices occupied much attention at the International Police Conference, recently held in New York, which was attended by police officials from all parts of the world. Here are seen, left to right, Mrs. Hugh Malossi; Inspector O'Brien, of New York; Chief of Police Hugh Malossi, of Rome, Italy; and Octavio Casanave, Prefect of Police, Lima, Peru, looking over some of the model signals



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Horace M. Swetland, President
W. I. Ralph, Vice-President E. M. Corey, Treasurer
A. B. Swetland, General Manager
David Beecroft, Directing Editor

Mallers Building, 59 East Madison Street, Chicago

BUSINESS DEPARTMENT

E. E. Haight, Manager

EDITORIAL

Clyde Jennings, Editor
B. M. Ikert, Technical Editor

DETROIT OFFICE
J. Edward Schipper

WASHINGTON OFFICE
26 Jackson Place, N. W.

BRANCH OFFICES

New York City—U. P. C. Bldg., 239 West 39th St., Phone Pennsylvania 0080
Detroit—317 Fort Street, West, Phone Main 1351
Cleveland—536-540 Guardian Bldg., Phone Main 6432
Philadelphia—1420-1422 Widener Bldg., Phone Locust 5189
Indianapolis—1212 Merchants Bank Bldg. Ph. Circle 8426

Cable Address.....Motage, Chicago
Long Distance Telephone.....Randolph 6960

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The Production Race

EVEN the lawyers are getting tired of the production in the National and State legislatures. It would appear from the face of the returns that the legislatures are the only rivals the automotive factories have for high speed production. As to the welcomeness of the product however, there is a wide difference.

The people generally and the dealers especially welcome the high production in the automotive factories and the results are beneficial to mankind and to business generally. The people benefit by the acquisition of the motor cars and trucks and pay the cost of operation without grumbling, as this cost is steadily decreasing. As a result, dealers who look well to their fences are making money and manufacturers are prosperous.

Now the other side of the picture. No one wants 99 per cent of the laws that the legislatures are turning out and the more laws that are put into the stocks statutes of the dealers (lawyers), the more grumbling you hear. The cost of maintenance of legislatures is steadily growing and the shops (courts) are entirely unable to cope with the mass of maintenance work dumped on them. Instead of getting more fool proof and easier to run, the legal machine is getting more complicated. The engineering is growing steadily worse. Instead of bringing health, better homes and contentment, the laws are halting ex-

pansion, creating radicals and curbing the personal liberties and ambitions of the people of this country.

As we see it today, the health, contentment and ambitions of this country are the stake in the race in production between the legislatures and the automotive factories.

The legislators have been unfair fighters. Instead of merely going ahead with their business of making more and more laws, they have directed a large percentage of their output toward crippling the sale and use of automobiles. In fact, they have been sanding our track to enable their own production curve to appear to go up faster.

In a contest of this kind you always have to fight the opponent in the style that he dictates, and certainly the automobile people did not start this rough and tumble battle. So we think it is up to the automotive industry to fight the legislators with their own weapons and begin to sand their tracks.

In the main, the legislative season for 1923 is closed. In Illinois and one or two other states the lawmakers are hanging on and running their mills overtime to further the pestilence that was thrown out of so many germ jars early in the year. So now it is time to prepare for the next production race.

Our suggestion is this: Between now and the next nominating season for legislators, let each automotive man look over the possible candidates, ask each one for his views on a low production proposal, and then vote for the man who favors the fewest laws and who favors letting the automobile alone. If you can find a man who will run on a strictly repealer platform, be for him.

If we can make some selection of low production men in the primaries and later in the elections, we will have a prospect of cutting down this pernicious rival for high production records.

If these law factories are permitted to go ahead unchecked, all chance for survival of the automobile or other business will be lost. The law dealers are protesting and will join in this campaign. Last week the President of the Illinois Association of Law Dealers made a very strong protest on this high production and the automotive dealers of the state should at once indorse his protest.



Seek sure profits rather than incur unusual speculative risks.



Who is in Charge?

RECENTLY the writer visited half a dozen automotive stores in one morning and in not a single one of these stores was there anyone on the floor to come forward and say "Good Morning" or give any other greeting. In just half of these stores, it was necessary for the caller to go to the bookkeeper's desk and ask as to the whereabouts of the manager. And you all know the old saying "There is none so deaf as an adder." That was true in these cases.

These stores were in a comparatively small city. One dealer is reputed to have sold 125 cars during the last year and certainly he could afford some one to stay on the floor of his store and greet people. In one store the caller, after much hunting, found an elderly woman hidden behind a door working with some papers. She did not know where anybody was and referred the caller to the shop. He went there, looked over the equipment, and

came away. Some of the men were working and some were not but they were not interested in callers.

Each of these stores had some accessories for sale but no one was on the job to sell them.

Just for the sake of contrast, a call was made at two piano stores in the same town. In one of them, the caller was instantly and pleasantly greeted. In the other, no one was in sight and after a wait the caller left. The piano store average was 50 per cent better.



"To make your stock pay bigger dividends, put more interest in it."



Association and Trade Promotion

IN the smaller trade centers there is quite a fashion among chambers of commerce and other boosting organizations to promote such trade magnets as "bargain days" and similar events. Public amusements are arranged and sporting events announced.

In some cases the local automotive dealer association joins heartily into this plan and each dealer puts out his bargains in accessories, tires or used cars as he sees fit. In other communities the automotive dealers appear to think that their business is too dignified or too lofty for participation in such events.

This is a great mistake. The automotive dealer who is going to survive needs all of the popularity he can get in his community and he should be one of the leaders in movements of this kind. The automotive dealers, as a class, run very high in business totals and they should be leaders in their communities in all affairs of this kind.



A satisfied customer is the most powerful salesman.



Selling Cars

INFORMATION from some points indicates that the lull in sales that was so universally noted two or three weeks ago has passed and that June is going to rank well as a sales month. Also some scattered reports have it that good used cars are in very good demand.

From the face of present reports it appears that the recession of stocks, talk of a check in the building industry, the slackening of price advances in the materials market had frightened some buyers. Now they are back in the market because they believe that the country is not in for a decided slump.

Also we believe that the automobile dealers have a good deal to do with the revival of buying. When the dealers realized that their sales were in a bit of a slump, they became more aggressive and were able to recover from the slump that had come in buying by putting a bit more punch in selling.

Recently we have read in many financial items comments that indicated that the writers were very critical of the persons who had dared think recently of a slump. It appears that the average financial writer thinks chiefly of peaks or slumps. He is not well satisfied with normal times. We believe that the recent recessions in prices of stocks, that the checking of prices of materials and the delaying of building plans were a good thing. We believe that a peak, far above normal, is a trouble breeder and the recent recession from a

peak that might have materialized, was a benefit to all concerned.

It bears out the opinion expressed on these pages a short time ago that conditions in the country are such that a punch in selling effort can overcome any threatened recession.



Pay more attention to proceeding solidly than to proceeding swiftly.



The Transportation Store

IN a conversation with a large distributor recently the expression "Transportation Store" which has been used frequently in MOTOR AGE was mentioned. The distributor said:

"I like the idea in the expression 'Transportation Store' and I believe that if it becomes current that it will bring home to more dealers the scope of their business than any expression I have heard."

This distributor has recently become a heavy jobber of accessories to his dealers. First he tested out the accessory business in his retail department and convinced himself that a car dealer could sell the proper accessories to his car customers and make money. Then he decided to urge all of his dealers to get into the accessory business. He knew that many of them needed the help that the profits on accessories would bring to them. He realized that car sales alone will not make a well balanced business.

So he is urging his car dealers to stock accessories and, to see that they do not buy badly, he opened a jobbing department. He sells only accessories that are suitable for the cars that he distributes. He says that his dealers are becoming quite enthusiastic about the accessory business.

We are glad to have this approval of the "Transportation Store." We believe that when the automobile merchant so considers his business he will then become a real merchant.



Well kept stock is a sales asset.



Invested Capital

A N accountant, who is also a salesman for a loose leaf system of bookkeeping, has had some very interesting experiences with automotive dealers during the past three years. In that time he has worked a considerable portion of his time installing his bookkeeping system in automotive dealer establishments.

He says that the chief fault with automotive dealers in their accounting is that they lose sight of invested capital. The business of the live automotive dealer is growing so rapidly and he is buying so much needed real estate and equipment and is carrying more and more of his time payment paper that he really loses count of what he is doing.

Only a few days ago a small dealer sent to MOTOR AGE his financial account for five months. He had not charged his investment in his overhead and despite a \$7,000 investment was making only wages out of his investment and his time.

Invested capital is a serious proposition. It must be kept in line with the annual turnover and returns must be made on it or the dealer is certain to fail.

May Production Exceeds 405,000

New High Record for One Month Surprises Industry

Total Cars and Trucks Made in First Five Months of This Year is 1,659,341

NEW YORK, June 8—A new peak in the automotive industry was reached when announcement was made by the National Automobile Chamber of Commerce that according to estimates based on shipping returns as compiled by its traffic department the production of passenger cars and trucks in the month of May reached the astounding total of 405,000.

This total comes in the nature of a surprise to those who had been watching the returns during the month. They had been expecting something like 390,000 or 395,000 at best, a comparatively small increase over April as increases go these days, so when the final estimate of 405,000 was made it created somewhat of a sensation among members of the Chamber who were here this week for the annual meeting of the big organization.

The May count is a new record, replacing the 381,745 established in April and brings the total for the five months of 1923 up to 1,659,341, a monthly average of 331,868 and a daily average of 13,168. For the last 12 months the count is 3,376,214. Compared with May, 1922, there is a difference of 148,781, the total 1922 the production was 2,406,396.

There is every indication that the railroad problem has been straightened out successfully. Carload shipments in May reached a total of 46,100, while drive-ways are reported at 60,500. That water transportation is growing in favor is shown by the announcements that boatload shipments were 12,050 in comparison with 4,443 in April and 7,406 in May last year.

While the Chamber does not segregate passenger cars and trucks in its monthly estimate, it is evident that the builders of commercial vehicles are enjoying the same prosperity as their colleagues in the other branch of the industry. It is figured that at least 10 per cent of the May total were trucks, which would bring the count up to 364,500 passenger cars and 40,500 trucks.

RUGGLES TRUCK INCREASED

SAGINAW, Mich., June 12—Increased prices on all models of Ruggles motor trucks will become effective July 1. Following are the models, with old and new prices:

Model	Old Price	New Price
15—3-4 ton	\$ 795	\$ 895
20—R 1 1-4 ton	1,295	1,375
40—2 ton	1,995	2,095
40 h 21-2 ton	2,195	2,295

Production by Months for 1923

Production figures for motor vehicles by months so far this year and for the corresponding months of 1922 are as follows:

	1923	1922
January	243,104	91,100
February	276,465	122,366
March	353,027	172,720
April	381,745	219,558
May	405,000	256,219

Slight revisions have been made in this table since its last publication in MOTOR AGE a month ago. The figures given here for May, 1923, are based on a preliminary estimate by the traffic department of the National Automobile Chamber of Commerce and are subject to revision.

Clifton and Other Officers Reelected by the N. A. C. C.

NEW YORK, June 11—The annual meeting of the National Automobile Chamber of Commerce, held on Wednesday and Thursday of last week, expressed its confidence in the Clifton regime by re-electing all of the old officers, which included the following: President, Charles Clifton, Pierce-Arrow Motor Car Co.; vice-president, Roy D. Chapin, Hudson Motor Car Co.; second vice president, passenger car division, C. C. Hanch, Lexington Motor Car Co.; second vice president, motor truck division, Windsor T. White, White Motor Co.; secretary, A. J. Brosseau, Mack Brothers Motor Car Co.; treasurer, H. H. Rice, Cadillac Motor Car Co.

Five directors were named to fill expiring terms, all of them members of the old board. Those chosen were Charles Clifton, Windsor T. White, H. M. Jewett, F. J. Haynes and A. H. Swayne.

Reports of trade conditions showed that sales are still remaining good, although a seasonal falling off in demand may be expected. More cars are being sold on time payments than ever before, while the used car business is best in the agricultural Northwest and in the steel districts.

Trucks are moving well and it is said that light truck prospects are fair to good, and best in large cities. Heavy trucks are in fair demand.

HAYNES PHAETON REDUCED \$100

KOKOMO, Ind., June 9—A reduction of \$100, from \$1,595 to \$1,495, on the price of the standard model "57" 5-passenger phaeton has been announced by the Haynes Automobile Co.

Sales of Tractors and Power Farming Machinery Increase

Gain in Southeastern States in April Was 14.4 Per Cent Over March Business

ATLANTA, Ga., June 8—Reports from the seven larger distributors of tractors and power farming machinery covering the southeastern field show an increase in sales during April of 14.4 per cent as compared with March, which is the more noticeable due to the fact that in March there was an increase of 45.4 per cent over February sales. In other words, sales in April were almost 60 per cent better than in February, and more than 100 per cent better than they were in March, 1922. As compared with April, 1922, sales for April this year were 44.6 per cent greater.

Implement and tractor dealers advise that there is a great deal of business to be obtained from farmers this year in the southeastern field by those who go after it with the right sort of merchandising methods. The field is far from being covered, and there are hundreds of farmers all over the section who do not as yet use tractors. Due to the fact that last year's cotton crop netted them very large profits, that the present price is holding firm and this year's crop gives every promise of also netting a large profit, practically all southeastern farmers are now worthwhile prospects for tractor and power farming sales.

There is also an excellent potential market here for truck sales, as shown by the experience of J. L. Couch, president of the J. L. Couch Co., of Columbus, Ga., truck dealers. In the latter part of May Couch made a three-day trip calling principally on well-to-do farmers in South Georgia, and as a result of these personal calls, sold more than \$20,000 worth of trucks during the short period. This company handles Garford and Internationals.

TRUCK PRICES CHANGED

ROCHESTER, N. Y., June 11—Effective June 15 prices of Selden trucks are readjusted, with increases on two models, a decrease on one model, and a new model has been added. The list, with old and new prices, follows:

Model	Old Price	New Price
30-C	\$2,250	\$2,375
50-B	3,250	3,250
53-B	3,640	3,550
70-B	3,750	4,175
73	New Model	4,475
90	4,950	4,950
Special Bus Chassis		4,850

170,992 FORDS IN MAY

DETROIT, June 9—Ford Motor Co. Production for May was 170,992 motor vehicles as compared with 121,073 in the corresponding month last year. Chevrolet figures will approximate 50,000.

Sales Receive a Renewed Stimulus

Johnson, Receiver, Elected Trustee by Mitchell Creditors

Committee of Appraisers Appointed—Tire Stock Sold at Premium Over Inventory

RACINE, Wis., June 9—Herbert F. Johnson, receiver of the Mitchell Motors Co., was elected trustee of that company at the first meeting of the creditors. Thomas Nimlos, of Milwaukee, was a candidate for the position of trustee, his name being offered by men who represented Milwaukee creditors, but Johnson received so great a support from the heaviest creditors that the men who were supporting Nimlos asked permission to change their votes and the election of Johnson was almost unanimous. Johnson filed a \$50,000 bond and at once assumed charge of the motors company.

Referee in Bankruptcy M. J. Knoblock appointed R. O. Hendrickson, J. A. Gemmill and M. C. Bias, all of Racine, as members of the board of appraisers to determine the value of real estate, buildings, stock and material owned by the Mitchell company. The appraisers will meet the first of the week and will submit a report to the referee June 14.

It was stated at the meeting that the Mitchell company sustained an operation loss of \$2,000,000 in 1922 due to the inability to sell automobiles at a profit, the cars being sold at less than cost of production.

The report of the receiver showed that he has disposed of several automobiles stored in Racine, Indianapolis and Phoenix and that he also sold a large number of tires for which he received \$26,818 although the inventory figure was \$20,533. It was stated that the Government will file a claim against the Mitchell company for \$400,000 that amount being alleged due for taxes for a period of three years. Edward L. Wratten, former traffic manager of the Mitchell company, has been appointed office manager of the company during the trusteeship.

GUNN QUILTS U. S. RUBBER

NEW YORK, June 11—The resignation of James Newton Gunn as vice president of the United States Rubber Co. and president of the United States Tire Co. is announced. In a statement C. B. Seger, president of the United States Rubber Co., states that he will assume direct charge of all tire divisions of the company and that he will be elected president of the United States Tire Co.

THE MILLIONTH OVERLAND

TOLEDO, June 12—This afternoon the shrieking of whistles and the boom of bombs greeted the millionth Willys-Overland car on its way out of the factory. Chief Engineer A. J. Baker delivered the car to President John N. Willys in front

of the Administration building and then Willys drove it down the boulevard for a few minutes and turned it over to Charles J. S. Phillips, salesman with the branch for a number of years. Phillips has sold the car which makes just \$1,000,000 worth of Willys-Overland products he has sold.

Virile Trade Press Aids Industry Says Graham

ATLANTIC CITY, N. J., June 9—George M. Graham, representing the National Automobile Chamber of Commerce at the general session of the Associated Advertising Clubs of the World here, told the meeting that advertising has been a fundamental of progress in the automobile business, that the industry uses every type of advertising to some degree, and he emphasized the importance of the trade press by saying, "Particularly have we had the invaluable support of a virile and constructive trade press."

After giving the advertising men some of the astonishing statistics of the industry as to production and amount of money involved, Graham as a member of the Highways Committee of the N. A. C. C., discussed the problems of motor transport as brought out by the constantly increasing use of the automobile.

General Motors Sales for May Were 74,500 Vehicles

NEW YORK, June 9—Preliminary combined sales in May of the American and Canadian passenger and commercial car manufacturing divisions of General Motors totaled 74,500 cars and trucks. This compares with preceding months and further with corresponding months of a year ago as follows:

Number of Cars and Trucks Sold		
	1923	1922
January	40,162	16,088
February	55,560	20,869
March	71,598	34,074
April	75,851	40,474
May	74,500	46,736
June		48,541

*This preliminary figure includes Buick, Cadillac, Chevrolet, Oakland, Oldsmobile passenger and commercial cars and GMC trucks.

BUYS GRANT FACTORY

CLEVELAND, June 9—The Lincoln Electric Co. of this city has purchased from the receivers the property of the Grant Motor Car Corp., paying \$426,000 for it.

6,781 FORDS IN A DAY

DETROIT, June 2—Ford Motor Co. went over 6,700 a day for the first time May 28 when 6,781 cars and trucks for domestic trade were built, exceeding the former high day, May 21, by 123.

Improve in Sections Where Late Spring Held Them Back

Manufacturing Activity Continues at High Level as May Breaks All Records

NEW YORK, June 11—More seasonable weather is acting as a stimulus to sales of automobiles in sections of the country where a slight lagging in purchasing has been apparent. This will prove of material aid in reducing the stocks of open cars which have accumulated in some dealers' hands due to a backward spring.

Closed car business generally continues in good volume, with body manufacturing plants working at capacity to meet current and back orders. Deliveries are somewhat slow owing to the heavy pressure exerted on builders by car producers and limited facilities to cope with it. Increased plant accommodations now under way will relieve the body situation to an extent and afford means of preventing the high piling up of orders which is now experienced.

With automobile manufacturers, operations are keeping at a high level. Exceptionally high schedules by some of the major producers with an improvement in the progress of others toward the end of the month brought the aggregate output of cars and trucks in May to 404,992.

This is estimated to be 20,000 more cars and 3000 more trucks than were built in April, which up to that time had held the production record, and is surprising in view of the high marks established during the last twelve months and a season when a slackening in both sales and factory operations is to be expected.

The figures are indicative not only of the advance in automobile output but of the steady movement forward in the truck branch of the industry where increased production necessarily is slow and where growth is dependent upon industrial expansion. As long as conditions throughout the country remain good, the forward trend will continue, and schedules will be moved up conservatively with the idea of re-establishing this branch on its previous footing.

There is a strong demand for the lighter duty trucks although commercial centers are increasing their call for the heavier vehicles. Farmers are good buyers, agricultural conditions tending toward extending sales possibilities in those sections. This is particularly true in southern territories where the outlook for a good crop commanding high prices is reported to be excellent. Tractors are being bought in heavier volume through the Southeast and manufacturers are looking for a continuance of a wholesome business there.

700 Delegates Attend the Roads Congress at Seville

Road Construction and Traffic Regulation are Topics of Gathering of 36 Nations

SEVILLE, May 22—Seven hundred delegates, representing 36 nations, attended the Fourth International Roads Congress in this city. American and British representation was the most prominent. It has been decided that the next road congress shall be held in Italy in 1926.

The work of the congress was divided into two main sections, dealing respectively with road construction and with traffic regulations. Considerable attention was paid to concrete roads which, while common in the United States, are very little employed in European countries, and as a result of the interchange of views, it appears likely that concrete construction will be extended to the Old World.

The congress passed resolutions in favor of national traffic laws for foot passengers, with clearly defined penalties for those breaking these laws.

Moon Prices Not Advanced; List of Models and Prices

ST. LOUIS, June 11—Prices of Moon cars have not been increased, it was declared here today by Oliver A. Life, advertising manager of the Moon Motor Car Co. Through an error it was stated in last week's Motor Age that prices of all models had been advanced \$100.

No advances in price of the Moon line are contemplated at this time, according to Life, who stated that earlier in the year it appeared that an increase would be necessary.

Following are the models and prices of Moon cars:

6-40 touring	\$1295
6-40 roadster	1295
6-40 sport tr.	1495
6-40 coupe	1585
6-40 sedan	1695
6-40 sport sedan	1895
6-58 7-pass. tr.	1785
6-58 sport tr.	1995
6-58 sport phaeton	1995
6-58 7-pass. sedan	2485
6-58 petite sedan	2585

H. K. Curll to Manage Truck Sales for Harvester Company

CHICAGO, June 9—H. K. Curll, who has been engaged in special sales work for the International Harvester Co. of America at the main office in Chicago, has been placed in charge of motor truck sales for the company. He has been with the Harvester company for 20 years, having started as salesman for the Pittsburgh branch. O. W. Browning has been transferred to New York to be in charge of truck sales from that branch.

The sales policy of the company will continue as heretofore. The main outlet for the company's trucks is through its 93 branches. Farm implement deal-

ers handling the Harvester lines will continue, wherever equipped with service stations and other facilities, to sell trucks. The company will continue its policy of appointing exclusive truck dealers at certain selected points where suitable dealers can be found.

Upon completion of the new truck factory at Fort Wayne, Ind., the company's plant at Akron, O., will be devoted to the manufacture of axles and other truck parts. Rapid progress is being made on the Fort Wayne plant, but it is not possible to say when it will be in operation.

Franklin Ships Over 91 Per Cent Closed Cars in May

SYRACUSE, N. Y., June 9—Over 91 per cent of May shipments from the Franklin Automobile Co. were closed cars. This reflects the strong popular demand for closed types. Franklin officials report an especially heavy call for the four-door sedan and for the new demi-sedan.

MAY SALES EXCEED APRIL

LOUISVILLE, Ky., June 10—Sales of new automobiles in Jefferson County of which Louisville is the county seat for the month of May amounted to 1,177 as compared with 1,057 in April. This brings the total sales of new cars for the first five months in 1923 to 4,231. Total for 1922 was 6,000.

Following is a comparison of sales for April and May divided into open and closed models, in four price divisions as indicated:

	OPEN		CLOSED		TOTALS	
	Apr.	May	Apr.	May	Apr.	May
High (\$2,500 and up)....	17	12	17	15	34	27
Medium (\$1,000 to \$2,500)	138	137	118	116	256	253
Low (Below \$1,000).....	110	117	87	93	197	210
Fords	344	477	226	210	570	687
Totals	609	743	448	434	1057	1177

DIRT TRACK RACE SCHEDULED

LOUISVILLE, Ky., June 9—A 50-mile automobile race for a purse of \$1,000 for the dirt track championship of the South will be held at the Owensboro fair grounds on the Fourth of July. The race will be held under the auspices of the Daviess County Fair and Exposition, of which James M. Pendleton is secretary.

TIRE DIRECTORS TO MEET

CHICAGO, June 9—A meeting of the board of directors of the National Tire Dealers' Association will be held here June 19. At this meeting, the place for holding the 1923 convention will be decided upon. Reports will be made of the progress of the association since the last convention.

FORMER A. A. A. PRESIDENT DIES

FRANKLIN, Pa., June 9—John a. Willson, former president of the American Automobile Association and first cousin of Woodrow Wilson, died here this week after a lingering illness, aged 72.

Dealers Stage Big "Blow-Out" for Thousands of Ford Owners

Picnic at Their Expense on Houston Beach Regarded as Great Business Stimulant

HOUSTON, Tex., June 9—The Houston Ford dealers staged a little party this week which is calculated to increase the number of sales of that make of cars in the Houston trade territory. At the same time it afforded an opportunity for about 20,000 persons to "get acquainted" and see just who own Ford cars. The party was a "Ford Blow-Out" on the beach some twenty-five miles from Houston. There were thousands and thousands of Ford owners in attendance and more than that of Ford owners, wives, sons, daughters, aunts, uncles, grandmas, then being 256,219. For the full year of grandpas, sweethearts and cousins. Incidentally there were acres and acres of Fords parked about the grounds during the day.

The Houston Ford dealers issued a blanket invitation to Ford owners to attend the celebration. It said, "Bring your Ford to our Blow-out." The "blow-out" consisted of a big picnic, plenty of dancing, boating, swimming, music, racing, ball games and other amusements. The entire expense was defrayed by the Houston Ford dealers.

Any number of persons declared there has never been as many Fords parked at one place, not even at the factory.

The Houston dealers in addition to paying the expense of the big blow-out, gave away a Ford touring car and hundreds of dollars in prizes. There were prizes for the Ford coming the longest distance, the Ford which had traveled most, the Ford bringing the oldest man, the fattest man, the tallest man, the homeliest man. There were prizes for the Ford bringing the prettiest girl, the tallest woman, the fattest woman, the youngest baby, the largest number of persons, and scores of other combinations.

The dealers declared they were eminently satisfied with the results. They claim the Ford owners will remain Ford owners, and that the big party opened the eyes of some Ford owners as to who really owned and drove Ford cars. Among the Ford owners present were millionaire bankers, oil men and lumbermen.

5,949 Willys-Knights Made in May; 16,333 Overlands

TOLEDO, O., June 9—Total production of the Willys-Overland factories for the month of May was 22,282 cars, according to figures announced by the management. Of these, 5,949 were Willys-Knights, the largest number of Willys-Knights ever produced in one month. The outlook for the next three months is promising beyond expectations, according to the management.

Schwab Tells Stutz Dealers He'll Back Company to Limit

Makes Address at Sales Conference
and Presents Medal to Winner
of National Contest

INDIANAPOLIS, June 8—The Stutz three-day convention last week, said by Fred Wilson to be the most successful one the company ever held, brought to-



CHARLES M.
SCHWAB

gether 157 distributors, dealers, sales and service men from all over the land. During the convention additional orders for a quarter of a million dollars' worth of cars were signed and distributors and dealers agreed to a large dealer factory advertising campaign to be run in newspapers throughout the country.

Lloyd C. Casey of Chicago won the sweepstakes gold medal and the purse of \$500 as first honors in the three months sales contest held by all dealers. Nineteen other salesmen won silver medals and charter membership in the Stutz Leader's League. At the sweepstakes dinner, Charles M. Schwab made the principal address of the convention and fascinated 250 dinner guests with an informal talk on Stutz growth as follows:

"My greatest pleasure in life now and always has been to watch things grow and grow and grow. The minute I became interested in Stutz I began to think of its growth. I am absolutely behind of the company, the car and every one of you who are associated in the Stutz. Mr. Thayer and I and our associates are in this thing for keeps. We will back you to the limit. There is nothing in our power that we will not do to make the company grow and grow and grow. We will not interfere in the slightest with Mr. Thompson and his staff, in whom we have the greatest confidence. The company already has registered a very gratifying growth and it will be my greatest pleasure to continue to watch it develop and grow and prosper as the rest of the service and endeavor and successful accomplishment. These are the most gratifying things in life. I have watched many companies grow from small beginnings until they have reached out to large influence. It is just this sort of growth I expect and predict for the Stutz.

"It always has been my idea and the policy of the concerns which I have been interested in to desire the prosperity of all my associates. I believe in sharing profits with those who help make things grow and Mr. Thayer and I and our associates want every dealer in the com-

Record of Tire Production and Sales for Four Months Compared with Last Year

NEW YORK, June 9—Production of pneumatic casings, inner tubes and solid tires decreased in April as compared with March, according to a compilation made by the Rubber Association of America for the Bureau of Foreign and Domestic Commerce.

In the same month shipments likewise fell off, and with the exception of solid tires there was an increase in inventories.

A comparative table of inventory, production and shipments as reported by the association is as follows:

PNEUMATIC CASINGS				
	No. Mfrs. Reporting	Inven- tory	Produc- tion	Ship- ments
1922				
January	66	4,174,216	2,055,134	1,596,806
February	66	4,691,329	2,084,308	1,562,365
March	63	5,183,286	2,645,790	2,073,963
April	65	5,464,336	2,401,187	2,086,651
May	65	5,523,095	2,721,503	2,639,273
June	64	5,042,147	2,838,890	3,133,260
July	63	4,834,106	2,476,636	2,695,095
August	63	4,629,392	2,905,209	3,029,823
September	64	4,612,037	2,504,744	2,502,106
October	64	4,682,958	2,674,662	2,588,770
November	62	4,964,976	2,733,134	2,379,708
December	59	4,599,208	2,656,942	2,934,079
1923				
January	62	4,695,916	3,127,270	2,994,297
February	60	5,224,387	3,217,987	2,588,639
March	58	5,670,601	3,865,726	3,322,637
April	56	6,088,272	3,539,326	2,976,160
INNER TUBES				
	No. Mfrs. Reporting	Inven- tory	Produc- tion	Ship- ments
1922				
January	66	5,246,647	2,343,393	1,839,724
February	65	6,141,956	2,596,774	1,702,583
March	63	6,991,118	3,017,511	2,090,737
April	65	7,230,096	2,650,573	2,329,343
May	65	7,189,552	2,970,696	2,938,947
June	64	6,186,543	3,130,629	3,973,679
July	63	5,675,839	3,068,199	3,630,744
August	63	5,207,228	3,808,224	4,220,055
September	64	5,164,757	3,501,442	3,558,971
October	64	5,488,033	3,787,758	3,420,680
November	61	6,210,053	3,850,908	3,075,023
December	59	5,732,125	3,411,074	3,825,949
1923				
January	62	5,838,310	3,951,835	3,748,651
February	60	6,771,958	4,039,202	3,001,697
March	57	7,740,945	4,875,414	3,828,315
April	55	8,394,184	4,259,558	3,535,635
SOLID TIRES				
	No. Mfrs. Reporting	Inven- tory	Produc- tion	Ship- ments
1922				
January	11	181,769	40,224	33,294
February	11	183,448	39,492	36,805
March	11	182,197	49,433	48,350
April	11	173,748	46,664	52,309
May	11	170,904	57,640	60,711
June	11	169,808	66,089	63,408
July	11	176,375	71,505	60,425
August	11	189,698	84,313	69,435
September	11	200,016	82,767	66,797
October	11	213,942	85,480	71,275
November	11	234,684	85,775	61,466
December	10	244,061	77,221	64,570
1923				
January	11	262,462	83,343	60,611
February	11	270,191	75,457	62,394
March	11	265,843	79,788	77,144
April	11	260,631	71,468	72,609

"Production" and "Shipment" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.

"Shipments" includes only stock forwarded to a purchaser and does not include stock forwarded to a warehouse, branch, or on a consignment basis, or abroad.

pany to make money and substantial profits. You cannot make too much to please us. If there is anything we can do to help bring this about you will find us ready if what you ask lies within our power. We are back of you to the limit, and there is no company in which I am interested that inspires me and interests me as does the Stutz which I believe will register a growth that will amaze us when we meet at some future year."

STUDEBAKER AT \$10 A WEEK
NEWARK, N. J., June 11—A \$10 a

week payment plan has been put into operation by the Studebaker Sales Corp., of Newark. The plan is applied only to the open models of the Light Six. Under the plan the customer's used car is taken in as the initial or down payment provided it is worth a reasonable sum. No other cash payment is made and the balance is paid off at the rate of \$10 a week. The car is covered by insurance for a period of two years which is the time over which the payments run. Interest and other charges are included in the payments.

Zero Milestone at Washington Dedicated With Addresses by Harding and Chapin

President Declares Automobile Has Revolutionized Highway Systems
and Is Bringing About Greater National
Unity

WASHINGTON, June 9—The Zero Milestone, the gift to the Government of the Robert E. Lee Highway Association, was dedicated Monday, with President Harding making the principal address. The Zero Milestone, located on the Mall, marks the beginning of the national system of highways and really is symbolical of the good roads movement in this country.

Coming as it did during the meeting of the Shriners, this dedication was a notable event in which the President played a most prominent part and his address will go down into history as a good roads essay of the highest caliber. The President paid tribute to the automobile for revolutionizing highway systems and bringing about national unity. He pointed out that the rural life of the nation is showing the effects of the transportation revolution which has been annihilating distances and costs and removing the disadvantages of remoteness and isolation which ever have been the greatest drawbacks to life in the country.

Thus far, he said, the automobile has been an evolution so rapid that the highway has not kept pace with the vehicle, but despite all our difficulties since the war, a truly wonderful progress has been made in highway construction until now the interstate system of approximately 200,000 miles begins to assume definiteness.

It was the contention of the President that we all have come to realize with the growth of motor transport in the open country that a broad plan always must be kept in mind, aiming to make an improved rural highways complementary to the railroads. He declared

that the motor car and the highways tend to strengthen ties of mutual interest and interdependence which unite all sections. He said that the development in this epoch of rapid and universal transportation the suggestion of disunion is unthinkable. He pointed out that the country has been dependent upon the development of internal highways because of the vast continental area. He regretted the fact that the development of rural roads as ributaries to railroads had not been as progressive as railroad expansion. He said that within two decades, however, marking the beginning of the motor age, our advance in this respect has been phenomenal, making it most fitting that a recognized center of the highway systems should at this time be set up.

The President commended the efforts of various road organizations for the completion of the main trunk highways and deplored the fact that there is not at present a single road from coast to coast which can be used unimpeded throughout the year.

Roy D. Chapin, vice-president of the National Automobile Chamber of Commerce, speaking on behalf of the automotive industry, said:

"Billions will be expended on our roads in our lifetime that highway transport may serve us. Partly from economic, but more largely from human reasons, we must all give pause and study this newly powerful agent of marching civilizations."

J. Walter Drake, who took office as Assistant Secretary of Commerce, also spoke on the highway problem and its influence on national life.

Two Salmson Cars Tie for Honors in 24-Hour Race

(By Mail)

PARIS, May 23—Piloting a couple of 67 cubic inch Salmson two-seater light cars, Desvaux and Benoist tied for first place in the French 24-hour road race with a total distance of 1,104 miles, equivalent to 46 miles an hour for the two rounds of the clock. The race was held over a road course, about four miles to the lap, and both drivers remained at the wheel the entire 24 hours. Casse, driving a similar Salmson, finishing third with a total of 1,072 miles, the others in order merit being Fratissier (Amilcar), 923 miles; Leblanc (Rally), 818 miles; Brault (Rally), 684 miles; Dayot (Defrance), 673 miles; Vassini (Defrance), 612 miles.

Senechal, driving a four cylinder ma-

chine of his own make in the 45 cubic inch class, covered 1,039 miles, or an average of 43.2 miles an hour. Battagliola on a Benjamin was second with 894 miles, and Madame Morriss on the same make of machine covered 843 miles. Another Benjamin covered 692 miles.

STUDEBAKER MAKES RECORD

SOUTH BEND, Ind., June 11—Production and shipment of 780 Studebaker cars on May 29 marked that day's output as the greatest in the history of the Studebaker Corporation. Present production is at the rate of 15,000 cars a month or 180,000 cars a year.

FIRESTONE REDUCES PRICES

AKRON, O., June 12—A reduction of 10 per cent in the price of tires and tubes was announced yesterday by Firestone Tire & Rubber Co.

Two New Cars to Be Put Out by Olds Motor Works

6-Cylinder Water Cooled Model
in September—Work Progressing
on Copper Cooled

LANSING, Mich., June 11—Olds Motor Works announces that in September it will put on the market a new popular price water-cooled six-cylinder automobile, along with its present line of fours and eights which will be continued into the 1924 sales year.

Progress is being made by the company on its copper (air) cooled six-cylinder car and when that car is ready for market, the announcement says, it will be offered through the present sales organization in addition to the water-cooled six.

Tone of Optimism Reappears in Business

WASHINGTON, June 11—Government officials are gratified with the new tone developed in business and financial circles. It is no secret that these officials had begun to show some concern over the excessive caution that had been manifested and which it was feared would give a sharp check to production and consumption. Government officials could not find the slightest reason for pessimism, but on the contrary found present practically every element necessary to help business. It is manifest that it now has returned to a basis of sound optimism, with every reason for doing so.

G. M. C. DISTRICT SALES MANAGERS

DETROIT, June 9—General Motors Truck Co. in connection with its sales policy of controlling business through a number of district sales managers, has thus far appointed seven men in the United States, and opened a branch at Oshawa, Canada. The sales managers in the United States and their territories are: O. E. Stoll, New York, North Atlantic seaboard; O. W. Crawshaw, middle western territory; E. G. Shenaker, the northwest; C. F. Rouse, western territory with headquarters at Kansas City; J. A. McDaniel, southwest with headquarters at Dallas, and H. A. Neill, Pacific Coast territory with headquarters at San Francisco. H. H. Henchel is Canadian district sales manager.

NEW GARDNER SPORT MODEL

ST. LOUIS, June 11—The Gardner Motor Car Co. has announced a new sport model in addition to the "Radio Special" which made its appearance a number of months ago.

The new sport model has a black top, is a rich "lake" (red) in color, is upholstered in black leather and has disc wheels to match the body.

Dealers Oppose \$100,000,000 Road Bond Issue in Illinois

Believe State Already Has Sufficient Funds From Other Sources to Build Highways

CHICAGO, June 7—The unusual situation is presented in Illinois of the automotive trade and many motor clubs actively opposing a state bond issue for the construction of hard roads. Twenty-five members of the Chicago Automobile Trade Association appeared this week before the House Committee on Roads and Bridges, to protest against a pending bill providing for a bond issue of \$100,000,000 for roads.

The Illinois Automotive Trade Association and local associations throughout the state, as well as commercial and banking associations, have gone on record against the bill which is sponsored by Gov. Small as an administration measure.

The opposition of the automotive trade to this bill is not because of lack of appreciation of the stimulus that good roads give to the automobile business. This state in the last two years has built hundreds of miles of hard roads and the automotive trade has profited thereby. These roads were built from the proceeds of a \$60,000,000 bond issue of which probably one-half is still available for projected road construction.

It is the contention of the automotive interests that the funds available from this bond issue and from automobile licenses and other sources will provide for the construction in the next few years of all the road mileage that will be possible with the available labor and material supply. They believe that an additional bond issue would result in inflation of material prices, shortage of labor, and the squandering of money in the mad race of politicians to grab a portion for their respective communities.

New Plan for Reorganization of National Motors Is Given

INDIANAPOLIS, June 9—A new scheme of refinancing the National Motors Corp. is proposed in a letter to creditors sent out under date of May 31, by President Clarence A. Earl, which, it is hoped, will give the corporation five years of grace in which to put the business on a sound footing.

As outlined by Earl, arrangements have been made for the elimination and funding of items aggregating \$5,103,100, which otherwise would have to be met and paid in cash during the next five years. This result was brought about by prevailing upon the holders of Series A and Series B bonds to waive for a period of five years the \$500,000 yearly sinking fund provided for under the terms of the trust indentures by funding all interest coupons due on the collateral trust gold notes prior to July 1, 1925, the interest amounting to \$637,500, by obtaining the cancellation of all existing agreements to repurchase an aggregate of \$1,965,600 of

collateral trust gold notes prior to their maturity.

This arrangement is contingent upon the creditors agreeing to co-operate as outlined, whereupon the corporation states that it can negotiate an underwriting contract for the sale over two years of \$10,000,000 of Series A no par common stock to be used only for a working capital. This is contingent however, on the creditors accepting a new issue of not exceeding \$3,000,000 of debenture notes to fall due in July, 1925, which could be used as a temporary medium of carrying the present general floating indebtedness of the company.

Salesman With 6 Months' Experience Wins Medal



LLOYD C. CASEY

Lloyd C. Casey, winner of a gold medal and \$500 in the Stutz Master Salesman contest, had never sold an automobile until six months ago. He had been in the United States navy for 20 years, serving as a lieutenant during the world war. Growing family responsibilities caused him to leave the navy and seek more remunerative employment. He was given an opportunity by F. D. Cerf, sales manager of the Stutz-Chicago Co., to sell automobiles. He did not ask for a drawing account or guarantee of any kind. In the first six weeks he didn't make a sale. But he kept at it and according to Cerf his daily reports showed as high as 30 personal calls day after day.

Between Dec. 18 and May 19 he made 836 calls on prospects, not including telephone calls. He has in his files 317 live prospects which he must see at least once every 30 days in order to retain the right to them.

PRIZE FOR USED CAR PROSPECTS

ST. LOUIS, June 9—The De Luxe Automobile Co., Oldsmobile distributor, has offered a prize of an Olds 7-passenger touring car, 1922 model, in excellent condition, to the person who furnishes the company with the largest number of used car prospects who buy cars from the company.

New Series of Cole Master Model Is Ready for Market

\$2,175 Is Price of Two Open Models; \$2,750 to \$3,175 for Closed Cars

INDIANAPOLIS, June 9—Cole Motor Car. of this city announces a new series of Cole Master Models in six body styles, two open styles of which will sell at retail at \$2,175. The closed cars range from \$2,750 for the Imperial Coupe to \$3,175 for the Royal Limousine, a seven passenger design.

Three open styles of the Cole Eight-Ninety Models are continued; the seven passenger touring, the four passenger phaeton and the two passenger roadster are \$1,885.

The chassis with certain refinements and minor changes in detail continues along Cole lines made familiar by the 890 series. The engine is a V type, eight cylinders, with a bore of 3½ in. by 4¼ in. stroke. The wheel base is 127½ inches, with a frame of special alloy steel tapered at the front to permit short turning radius, and widened at the rear for rigid body support. The equipment is most complete.

The body styles and prices of the Master Model series are as follows:

Open Cars	
Volante, 4-pass.	\$2,175
Westchester, 7-pass.	2,175
Enclosed Cars	
Royal Limousine, 7-pass.	3,175
Royal Sedan, 7-pass.	3,075
Brouette, 4-5-pass.	3,075
Imperial Coup, 4-pass.	2,750

The Cole Eight-Ninety models and prices are as follows:

890 Touring, 7-pass.	\$1,885
890 Phaeton, 4-pass.	1,885
890 Roadster, 2-pass.	1,885

Fred J. Wagner Pulls Up Stakes for California Home

NEW YORK, June 8—The testimonial dinner given Fred J. Wagner, famous race starter, at the Astor by the Motor Club, on the eve of his departure for California, which will henceforth be his home, was featured by the presence of United States Senator Royal S. Copeland, State Senator James Walker and Deputy Police Commissioner John A. Harriss, the man who evolved the tower system of traffic control in New York. Presided over by Albert Reeves, general manager of the National Automobile Chamber of Commerce, the dinner was a strong testimonial of the popularity of "Wag," more than 150 old timers of the industry attending.

Fred E. Moscovics of the Nordyke & Marmon Co. made the presentation speech when the Motor Club's gold watch was given the guest of the evening.

OLDS DELIVERIES INCREASE

DETROIT, June 9—Oldsmobile deliveries in the first five months of this year are reported to be 39 per cent in excess of last year and 43 per cent ahead of 1921.

Iowa Automotive Merchants Assn. Drives for Members

15 Districts Spread Over State, Headed by Director, Make for Strength

DES MOINES, Ia., June 9—Iowa motor trades men are making an effort to induce all reputable dealers of Iowa to join the Iowa Automotive Merchants' Association, according to A. J. Knapp, secretary. The state has been divided into 15 districts, each district being headed by a director elected at the last annual election of officers.

Secretary Knapp has outlined a budget for the coming year and divided this budget among the 15 districts. The director of each district has pledged himself to raise his portion of the budget and to not relax efforts until sufficient membership has been secured to satisfactorily carry on the work for another year.

Automotive men of Iowa have recognized the splendid legislative work done by Secretary Knapp during the recent session of the state legislature and many are voluntarily applying for membership. Through Knapp's efforts, several bills aimed at the motor trades interests of the state were defeated.

It is the aim of the association to admit none but reputable dealers to membership and to make the emblem of the association a sign of honest service. Every application for membership in the association must be accompanied by the indorsement of three members in good standing. The application is then passed upon by the directors and, if desirable, the dealer is given membership and allowed to display the association emblem.

A field representative, W. R. Van Der Kar, has been helping Knapp cover the Iowa territory more effectively. Van Der Kar was formerly connected with the Cray Motor & Implement Co., of Boone, Ia., and was for a time at the head of the Boone County Motor Trades Association.

Rolls-Royce Production to Be Kept Up Through June

SPRINGFIELD, June 8—Continued production at capacity through June at the Rolls-Royce plant is assured, it was said today, owing to the demand holding strong and deliveries failing to keep pace with orders last month. Barring the usual seasonal reaction in sales, during July and August, prospects for business are considered excellent, and all plans are being ordered with a view to a busy fall.

The establishing of the company's own coach works, with a capacity to turn out a full quota of bodies, has proved a decided advantage. G. E. Doolittle is now in charge of the coach works. George W. Kerr, former manager, remains with the works as consultant. C. O. Beck has succeeded Jules Olivier as head designer.

DURANT HAS MADE 148,542 CARS

NEW YORK, June 8—A new high water mark for Durant production was reached on May 31 when a total of 1356 cars in all lines was produced. The total for the month was 24,164 as compared with 21,194 for April, making a grand total of 148,542 since production was begun on the Durant lines. Production on closed models is being increased as rapidly as possible.

Horace E. Dodge's Stock in Dodge Bros. is \$29,000,000

DETROIT, June 9—Inventory of the estate of the late Horace E. Dodge filed in Probate Court shows a total estate of \$37,186,588.48. This is slightly in excess of the John F. Dodge estate of \$36,892,588.41. The bulk of the estate consists of 50,000 shares of Dodge Brothers, Inc., valued at \$29,343,350. He owned Dodge Bros. Realty Co. stock worth slightly over \$1,000,000, and 10 shares of Ford Motor Co. of England, worth \$314,155. Victory and Liberty bonds owned approximated \$4,000,000. The rest of the estate was in bank stocks and personal property.

His two yachts were valued at about \$300,000. Shotguns and pistols among the personal effects were valued at over \$1,000, two guns being inlaid with gold.

SINGER MUST PAY FOR TRACTOR

BRIDGEPORT, Conn., June 9—John McCormack of Tokeneke, world-renowned Irish tenor, must pay Luther M. Wright, Norwalk automobile dealer, for a farm tractor which Mr. McCormack's superintendent tried out at the singer's Darien farm and returned to the dealer with notice that he did not care to buy it. The decision in favor of Wright, rendered in the Superior Court here some time ago, has just been affirmed by the Connecticut Supreme Court of Errors in an unanimous decision. The amount of damages McCormack must pay is approximately \$2,000, with costs.

SALE GAIN IN DENVER

DENVER, June 8—Retail sales for May averaged a fairly good gain over April and also a year ago, with some dealers reporting as high as 25 and 30 per cent increase. Reports of enlivened trade also coming in from outside distributing territory with gradual clearance of snow and opening of roads to comfortable travel in mountainous sections, and distributors predict strong summer selling throughout the territory. Although some dealers say used car trade is slow, others report used cars holding their own with new gains.

NASH SEES GOOD OUTLOOK

KENOSHA, Wis., June 9—"The general outlook for business during the last six months of the year is decidedly more favorable than it appeared three months ago," says C. W. Nash, president of The Nash Motors Co. "Conditions, in fact, look far better for the last half-year period than I had hoped in March, they would look."

"Ask 'Em to Buy" Meetings in New England Successful

A. E. A. and New England Jobbers Club Sponsor More Than 30 Showings

CHICAGO, June 9—More than 30 "Ask 'Em to Buy" meetings, held throughout the New England States since March 17 under the auspices of the New England Automotive Jobbers' Club and in co-operation with the Automotive Equipment Association, have produced very satisfactory results in the increase of sales, according to representatives of the merchandising department of the A. E. A., who have participated in some of the recent meetings.

This New England campaign has been well organized, through the complete co-operation of 26 jobbing firms in that territory. Headquarters were opened in Boston and E. J. Ashton, formerly a salesman for a number of jobbing firms, was employed to direct the work, conduct meetings and tell the stories of Ask 'Em to Buy and Shop Profits.

In order to provide funds for this campaign an assessment was levied against each of the participating jobbing firms, the amount varying from \$300 to \$700, according to volume of business.

The dealers in cities where meetings have been held have showed great interest and in some cases arrangements have been made for repeat meetings in order that some who were not able to attend the first meeting might reap the advantage.

At a recent large meeting in Boston, E. C. O'Donnell of the A. E. A. Merchandising Department was the speaker.

Work Begun on Brooks Steam Car Plant in Toronto, Can.

TORONTO, Ont., June 9—Work has begun on the construction of the Brooks steam passenger and commercial cars in Toronto. Temporary manufacturing headquarters are being used on Atlantic avenue until a new plant can be built large enough to take care of the demand. The draftsman's sketch of the 7 passenger car gives an idea of the lines of the Brooks Steamer. The first Brooks Steamer scheduled for production soon is the Brooks Intermediate, with wheel base of 122 inches, retailing for about \$2,000. Then comes the seven passenger Brooks Steamer, retailing at about \$3,000, and the popular priced small Brooks Steamer, which will retail at about \$1,000.

NEW FUEL COMPOUND

CHICAGO, June 8—The Lubac Corporation of Chicago is preparing to place on the market a compound known as Lubac which is a petroleum derivative to be added to gasoline or benzol when used as motor fuel. It is claimed that this preparation, in proper proportion, assures smooth and complete combustion of the fuel and eliminates detonation.

Eagle 4 and 6 Announced as Additions to Durant Lines

New Cars Will Be Made at Flint Factory and Are to Be Shown About Aug. 1

NEW YORK, June 9—Durant Motors, Inc., is announcing this week the Eagle 4 and 6 as the latest additions to its line. They will be manufactured in the plant at Flint which was built for the Star. The new cars will be shown for the first time about August 1, and they will be in production by the beginning of 1924.

Prices have not been definitely set, but it is understood that the four cylinder line will compete with the Chevrolet, while the six cylinder will be in a somewhat higher price class, although it will sell for considerably less than \$1000.

Few details about the Eagle are available. The chassis will be similar to that used for the Star with the Durant tubular backbone and the wheel base may be a trifle longer than on the Star. Especial attention will be given to the body lines and appointments.

No decision has been reached in regard to dealer representation, but it is possible an entirely separate sales organization may be formed.

ETHYL GAS SALE LIMITED

DETROIT, June 12—Sale of tetra ethyl lead, the General Motors Chemical Corp. anti-knock fuel, which is to be marketed under the name Ethyl Gas, probably will be confined to Dayton and Cincinnati for the balance of the year, owing to low production, but as greater production is attained the sale of it will be extended to all cities. Detroit and Pittsburgh are mentioned as the next cities in which it will be introduced.

Selection of Dayton and Cincinnati as the original cities of introduction is due to the proximity of these to the seat of distribution at Dayton, and also to the hilly condition in that section which gives the fuel greater opportunity to demonstrate its efficiency. Dayton will have one filling station at which the fuel will be distributed and Cincinnati will have ten, the latter getting into operation within the next 15 days.

AUTOCAR ELECTRIC EXHIBITED

NEW YORK, June 9—An Autocar electric truck was a feature of the Electric Truck Show, held here last week, under the auspices of the New York Edison Co. The construction of this truck follows that of the two cylinder, gasoline driven Autocar truck. The engine, clutch and gearset in the latter has been replaced by an electric motor, and an electric battery has been underslung on the frame on either side of the propeller-shaft.

Other trucks exhibited were the O. B., Commerce, Ward, Walker, Steinmetz, Lansden, Kelland, and Baker R. & L.

DEALERS WANT EARLIER SHOW

HARTFORD, Conn., June 9—Hartford dealers will stage another automobile show next winter. Just at present there is evident a desire to have the show follow the national exhibition in New York early in January. There is a growing desire for an earlier show for the reason that too many prospects hold back for the local exhibition before buying their new cars. The early show, it is argued, will eliminate the dull period of January and February. E. C. Bowman is the chairman of the show committee, which will stage the next show. Associated with him are D. A. Harrington and R. P. Taber.

New Company Has Schedule of 200 Closed Bodies a Day

DETROIT, June 8—Capacity of the new Trippensee Closed Body Corp., will be approximately 200 closed bodies a day and about 100 to 150 open bodies, two plants of the company to be devoted to the building of the body proper, and the former Everitt plant to the finishing, upholstering and painting. The manufacture of the open and closed bodies will be carried on separately in the two of the former Trippensee company.

The complete list of officers shows Frank J. Trippensee, president; R. S. Everitt, vice-president; G. D. Everitt, secretary and treasurer, and Walter Serenberg, assistant secretary and controller. The board of directors is headed by Byron J. Oades, as chairman, and includes the three first mentioned officers and Russell G. Finn, Ralph Routier and Arthur J. Stock.

CURB PUMPS TO BE OUSTED

AURORA, Ill., June 9—Automotive dealers here are aroused over the action of the city council in adopting a resolution for the preparation of an ordinance removing all gasoline pumps from curbs, parkings and sidewalks of all down town streets. The action followed the application of the National Refining Co. and also the Standard Oil Co. to erect curb pumps. The city ordinances have been vague in this direction. With the filing of the two petitions, the council decided to take a radical stand and decline all such permits in the future and also order all of the present pumps removed.

Garages and accessory shops which have maintained these pumps for the convenience of their customers are protesting the order and feel that the action will work a hardship upon the motoring public. The new ordinance will affect about 20 filling stations of the business district. It is planned to make it effective July 1 unless the automotive dealers can secure a postponement or reconsideration.

STEWART ADDS LIGHT TRUCK

BUFFALO, N. Y., June 9—The Stewart Motor Corp. has added to its line a 1-ton speed truck, the chassis of which lists at \$990.

Winton Stockholders Vote to Enter Dorris-Haynes Merger

Consolidated Motors Corporation to Operate Plants if Deal is Completed by Dorris' Entrance

CLEVELAND, June 9—Stockholders of Winton Motor Co. this week voted to go into the proposed merger of automobile plants put forward by C. P. Holzderber, representing the Bankers Issues Co. of New York City. Stockholders of the Haynes Motor Co., Kokomo, Ind., already have voted to go into the merger, and stockholders of Dorris Motor Co., St. Louis, will take action shortly.

The Consolidated Motors Corp. is to operate the plants if the merger is completed. It will have a \$19,000,000 capital. The Winton Company, it is understood, will receive \$1,000,000 in cash for its plant and equipment, \$250,000 of debentures and 93,000 shares of common stock. The cash would be used to liquidate present indebtedness of Winton and the securities would be disposed of as desired. Present capitalization of Winton includes \$1,350,000 of 7 per cent cumulative preferred stock and \$1,000,000 of common.

George H. Brown, secretary-treasurer of the Winton Company, said the merger would improve the position of Winton. Through the consolidation all of Winton's obligations would be paid off, and while the automobile plant would be operated under the name of the Consolidated Motors Corp., the Winton Engine Co., maker of marine engines, would retain its corporate identity. The consolidated company will have \$5,000,000 of 7 per cent debenture bonds and 700,000 shares of no par value common stock representing a book value of \$20.

Dorris Stockholders Meeting Called to Decide on Merger

ST. LOUIS, Mo., June 11—A meeting of the stockholders of the Dorris Motor Car Co. has been called for June 14, at which time the proposed merger of the Dorris, Haynes and Winton companies will be decided upon. This course of action was the result of a recent meeting of the board of directors of the Dorris Co., which was held at its plant. All the directors with the exception of Parker H. Woods attended. George P. Dorris, president; Frank C. Thompson, vice-president; Jesse A. McDonald, H. B. Krennig, B. E. Chappelow and George C. Griffith were the directors who considered the merger favorably and called the meeting of stockholders.

NASH SHIPPED 6,208 IN MAY

KENOSHA, Wis., June 8—May was the biggest month in the history of The Nash Motors Co. Shipments for the month exceeded those of April, the previous record month, by 582 cars and eclipsed the record of May, 1922, by 1,073 cars. In other words, Nash Motors shipped in May of this year 6,208 passenger cars as against 5,125 cars in the same month last year.

Texas Dealers Hit Fast Stride

200 Attend Association's Convention at Corpus Christi

John E. Morriss of Dallas Elected President—Next Year's Meeting to be at Fort Worth

CORPUS CHRISTI, Tex., June 9—An unusually interesting and instructive program was carried out at the annual convention of the Texas Automotive Dealers' Association which closed its sessions here May 31. At the election of officers to serve during the next year John E. Morriss of Dallas, was chosen president. W. A. Williamson of San Antonio was re-elected first vice-president and general manager; Kenneth Cox of San Angelo was named second vice-president and L. L. Dixon of Withica Falls, the third vice-president. Directors elected were: J. W. Atwood, Jesse Dennett, Walter Gerlich, Tony Chisum, Ellis Boyd, H. E. Pearce and J. N. Mitchell.

The 1924 convention will be held at Fort Worth.

The two principal addresses were made by A. R. Kroh of Akron, O., and Arthur R. Mogge of the merchandising department of the Automotive Equipment Assn., Chicago. Mogge's talk was on a campaign recently adopted by the Automotive Equipment Association, the salient points of which are first, Look 'em Over; second, Ask 'em to Buy, and third, Ask 'em to Pay. This campaign is being promoted in all parts of the nation, and according to Mogge is being productive of good results.

W. A. Williamson, vice-president and general manager of the association, took occasion to tell the delegates that it was time for business men's organizations to get into politics.

"Don't criticize the members of the legislature for the laws that are passed, but you should criticize yourselves for sending them there. Every organization of business men should take a hand in politics," he said.

The value of trade papers was discussed by Kroh. He told of the years a doctor or lawyer spends in studying the profession, and even after he is admitted to practice he is compelled to study continually in order to keep up to date.

"The automobile dealer must study his own business just like the lawyer and doctor," he said. "Most of you think you are too smart to spend any of your time studying. But nevertheless 30 per cent of all dealers went out of business last year. That's how smart you are. Don't be satisfied with conditions; make them better; improve yourself: Henry Ford, Charles Nash, W. C. Durant and the Dodge Brothers owe their success to the fact that they were not satisfied with things as they are today.

More than two hundred delegates were present at the meeting. Percy Garrett

of Fort Worth, the president of the association, presided at the meetings.

All of the business meetings of the dealers were open forums. The continual taxing of various phases of the automotive industry is coming in for a great deal of attention. A campaign to increase the membership of the State Association is being planned.

With more than 1,800 dealers in the State, said W. A. Williamson, vice-president and general manager, less than one-fourth of them belong to the association.

Movie Film to Show Public How Gasoline Engine Works

WASHINGTON, June 8—Educational films showing in a graphic manner the complete operation of a gasoline engine will be exhibited by the Department of Interior through the Bureau of Mines. It is intended to give automobile owners an intimate knowledge of the operation of a motor.

The Continental Motors Corporation cooperated with the Bureau of Mines in the filming of this picture. Special views have been made to show the cycles through which the gas travels from the time it enters the engine as an explosive mixture, until the time it leaves the engine as a burned gas. With the aid of special lenses, some unusual "close-up" scenes have been obtained. In order to show clearly what has taken place inside the engine and the particular role which each part plays in creating power from liquid fuel, much elaborate work was done.

Bright Prospects for Sales in Arkansas and Texas

Arthur R. Mogge Finds Good Crops and High Prices Give Dealers Confidence

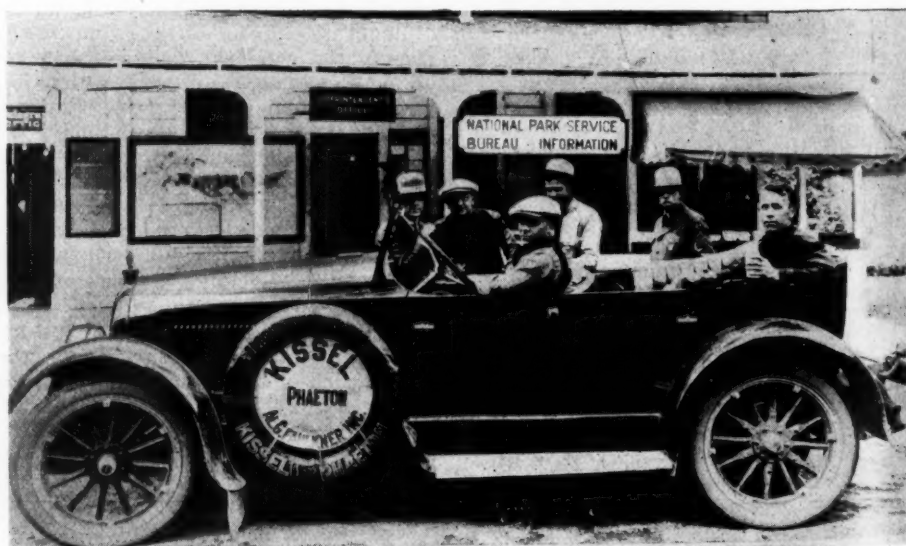
CHICAGO, June 11—An unusually bright outlook for the automotive trade in Texas and Arkansas for the next few months is reported by Arthur R. Mogge of the merchandising department of the Automotive Equipment Association who has just returned from a tour which took him into many cities of the two states.

A large cotton crop with the price continuing high is bringing promises of prosperity to the farmers. A favorable season has been highly beneficial to other crops, with the result that reports from all sections of the state were optimistic.

One of the meetings which Mogge attended was the annual convention of the Texas Automotive Dealers' Association at Corpus Christi. There he met leading dealers from all parts of the state and all expressed complete confidence that sales of cars, trucks and accessories will continue good through the summer.

Among the cities in Texas which Mogge visited, speaking at meetings of dealers, were Greenville, Dallas, Corpus Christi, Waco, Austin, and Fort Worth. He also spoke at dealers' meetings in Little Rock and Fort Smith, Arkansas, and he found dealers in these cities surprisingly optimistic as to the prospects for business this summer.

Makes Difficult Mountain Trip in High



Seeking a test that would indicate the stamina and power of the Kissel car, L. D. Whitehurst, sales manager of A. G. Faulkner, Inc., Kissel distributor at San Francisco, decided upon a run from Merced, Cal., to the Yosemite Valley in high gear. There was no record of this feat ever before having been accomplished. The distance was about 100 miles over dirt and muddy roads, with grades of from 12 to 29 per cent. At the start the transmission was sealed in high gear by the Merced police department and at the finish the car was examined by the superintendent of the National Park Service and found to be still sealed in high with no indication of having been tampered with. The driver and observer who made the trip are shown in the photograph in the car at the finish.

CONCERNING MEN YOU KNOW

S. S. Sonneborn has joined the Splitdorf Electrical Co., with headquarters at the factory in Newark, N. J. Sonneborn, who has had 30 years' experience in his line, will take complete charge and supervision of moulded parts of shellac, rubber and synthetic compositions for Splitdorf.

R. E. Stuntz, formerly with the Stromberg Motor Devices Co., of Chicago, has been appointed general manager of the Automotive Battery Service Co., of Cleveland, O., state distributor for Westinghouse batteries and other automotive products. This company has branches at Steubenville, Cincinnati and Cleveland.

C. D. Stimson, for many years connected with the motor truck industry in Chicago, has been appointed central states manager for the Bethlehem Motors Corp. His office will be at 1033 East Marquette road, Chicago.

Herbert J. Adair, president of the Trexler Co. of America, has also assumed the general management of the company, which manufactures the Trex gearsnift lock and the Trex rim tool. Adair long has been associated with the industry in manufacturing executive capacities and from now on he will devote his personal attention to the sales end of his company.

W. L. Velie, president of the Velie Motors Corp., Moline, Ill., who raises thoroughbred Herefords on his large ranch near Great Falls, Mont., is quite proud of the fact that Jack Dempsey, the heavyweight boxing champion, has purchased two registered bulls from his ranch. He wired Dempsey congratulating him on his judgment of live stock and received an invitation from the champion to attend the latter's fight with Tommy Gibbons on July 4.

Through the resignation of John V. Mowe as vice-president, director and sales manager, caused by continued ill health, a number of changes in the administration personnel of the Kelly-Springfield Tire Co., have been made. Maurice Switzer, vice-president, will continue supervision of sales and advertising, but W. H. Bell becomes sales manager in charge of branches and organization and T. S. Lindsey sales manager in charge of branch and manufacturers' sales. H. R. Hurd, formerly assistant advertising manager, becomes advertising manager, with E. E. Hill as his assistant.

J. A. Nichols has been appointed retail sales manager of the De Luxe Automobile Co., St. Louis, Mo., Oldsmobile distributor.

K. C. Babo of Dodge Brothers has been elected president of the Detroit Foundrymen's association. Others named as officers were Robert Crawford, Atlas Foundry Co., vice-president; D. R. Hay, secretary, and Fred Cowan, treasurer.

Robert E. Lee, secretary of the Automobile Dealers' Assn. of St. Louis, arranged for 13 firms to furnish two unloading experts each to unload 22 cars which a party of Shriners en route from California to their convention in Washington shipped across the state of Missouri in order to escape the mud roads. The unloading was accomplished in less than two hours.

C. A. Schoessel has been appointed superintendent of the John Deere Harvester Works, East Moline, Ill., according to an announcement by C. N. Stone, general manager of the plant, and R. C. Tolmie has been advanced to be assistant superintendent.

The Remy Electric Co., Anderson, Ind., announces that R. K. Evans, formerly one of their sales engineers, was appointed service manager on June 1 to fill a vacancy created by the resignation of E. E. Eby. Eby is to join the sales staff of the Hyatt Roller Bearing Co. at Newark, N. J.

Charles C. Younggreen, who has been director of advertising and publicity for the J. I. Case Plow Works Co., of Racine, Wis., has resigned to accept the position of vice-president with the Klau-Van-Pieter-Dunlap Advertising Agency, Milwaukee.

Stanley P. Seward has succeeded M. H. Newton as advertising manager of the White Motor Co. of Cleveland. He has been with the White company 10 years. Newton will take up other work with the company.

E. B. Hershberger, who is in charge of advertising at the Ford Dodge branch of the international Harvester Co., Fort Dodge, Ia., delivered his address, "People and Things," before the Advertising Club of Rockford, Ill., June 4. On June 5 he addressed the Lions Club of Kankakee, Ill. He is a member of the Speakers' Bureau of the Associated Advertising Clubs of the World and president of the Advertising Club of Fort Dodge.

George H. Connell, 54, foreman in the paint department of the Velie Motors Corp., Moline, Ill., died May 31. He had been ill two weeks. Connell had been foreman of the department in the old Velie Carriage Works and later in the motor factory, serving 20 years.

High Cotton Price Keeps Car Sales High in South

Open Cars in Strong Demand and Used Car Sales Are Unusually Good

ATLANTA, Ga., June 9—According to distributors and dealers in Atlanta, there has been no falling off in retail sales the past month, and general conditions over the southeastern territory give every promise that there will be no appreciable decline in sales in the immediate future. The South is differently situated in this regard than other sections, due to the high cotton prices prevailing that have enabled the growers to realize worthwhile profits on last year's crop, the year as a whole proving one of the largest financially in the history of the cotton industry in this section. Sales, therefore, are particularly good in the smaller towns and rural communities.

Open models are in such demand that lower and medium priced cars are difficult to secure where wanted immediately, dealers here state. Used car sales also are holding up well, and as a whole better than they have been in some time.

Financially, according to the latest Federal Reserve Bank report, the whole district has continued to improve, and all lines of business have experienced the favorable results of this. Truck sales to commercial concerns are better in this section than they have been in years.

TENT FOR A SHOWROOM

ST. LOUIS, June 11—The Ward Motor Co. has opened a tent, 26 by 40 ft., at Bellevue avenue and Manchester road in Maplewood, which is used as a showroom. The tent has a sawdust floor on a cinder foundation, is lighted by electricity and equipped with a telephone. The tent showroom is used to display used cars principally, but later new Maxwells and Chalmers will be exhibited there. Ten cars may be displayed in this novel showroom.

SALES DECLINE IN BUFFALO

BUFFALO, N. Y., June 9—The retail automobile business here during May did not quite measure up to expectations, but the falling off was not sufficient to cause dealers serious concern. The call for closed cars was greater and the demand for open models correspondingly less than in May of 1922. Used cars that are bought right and sold right as to price are moving readily.

FORD FOREIGN SALES

DETROIT, June 8—During the first four months of the year foreign sales of Ford cars and trucks reached a total of 76,142, which is 35,883 more than were sold in the same period a year ago. In the same months tractor sales abroad totaled 4,534 which compares with a total of 1,894 last year.

Franklin Dealers Compete to Determine Championship

SYRACUSE, N. Y., June 11—Franklin dealers throughout the country are engaged in a sales contest inaugurated by the Franklin Automobile Co., to determine the championship for the first six months of the year. Dealers have been divided into seven classifications, according to size of territory, and the one in each class who delivers the most cars from Jan. 1 to the end of June will be declared the champion of his class.

The reward to the winner in each class will be a full page newspaper advertisement announcing his accomplishment, paid for by the Franklin company. The winner of second class in each classification will be given a half page advertisement. The company reports that sales for the first five months of this year were 88 per cent greater than for the corresponding period of last year.

WILLS SALE POSTPONED

DETROIT, June 9—The sale of the C. H. Wills & Co. property, scheduled for June 6, has been adjourned for two weeks following application to the special master in chancery by counsel representing the reorganization interests. The sale will be held June 21 at Marys-

ville, bidders to deposit checks for \$200,000 24 hours ahead.

Reasons for the adjournment were unknown to the receiver, counsel leaving the city following the granting of delay. In the opinion of the receiver, the delay was requested to give creditors and bank executives additional time to work out details of the reorganization before the plant is bid in.

SPRING PLANT SALE APPROVED

CLEVELAND, June 9—The sale of the Hess Spring & Axle plants of the Standard Parts Co., to Albert J. Mayer of Cincinnati, was approved by Federal Judge D. C. Westenhaver. The purchase price for the plant, which is situated in Cincinnati, was \$136,000. The federal judge also ordered a five per cent dividend to be paid to creditors, whose claims have been allowed. The distribution of the 5 per cent will bring the total disbursements to general creditors up to 60 per cent of their claims amounting to \$9,619,439.

M. A. M. A. SALES INCREASE

NEW YORK, June 9—Reports from members of the Motor and Accessory Manufacturers' Association show that sales in April increased 4 per cent over the preceding month, total purchases amounting to \$61,647,050.

BUSINESS NOTES

The Price-Hollister Co., a corporation formed by accessory dealers, has opened a new store at 2739 Locust street, St. Louis. Charles W. Price is president; G. S. Hollister, vice-president, and Robert L. MacDonald, secretary and treasurer. "Jumbo Products" will be the trade name of the line of accessories which the company plans to handle.

The Waller Manufacturing Co., Dubuque, Ia., has been incorporated in Iowa to manufacture automobile parts, accessories and garage equipment. The principal products of the company are the Universal piston pin aligning jig, the Universal heater cut-out and the Waller car heater. Officers of the company are: O. M. Waller, president; Joe Simones, vice-president, and J. Mahoney, secretary-treasurer.

The Trump Rubber Co. has been incorporated with a capital of \$200,000 to manufacture and sell tires, tubes and accessories for automobiles, at 1857 E. Market street, Akron, O. Incorporators are Elno H. Trump, Ross M. Trump, Frederick G. Alderfer, Sr., Fred Alderfer, Jr., and Willis Bacon.

The Akron Silica Rubber Co. has been formed at Akron, O., to manufacture battery containers and battery accessories from Kin-silite, discovered and perfected by Homer L. Kinsley, formerly of the Goodyear Tire & Rubber Co. An output of 1200 battery boxes a day is planned. Officers of the new company are C. W. McLaughlin, president, who also is a director of the Mohawk Rubber Co.; Mathew Dettleback, vice-president, who is assistant secretary of state; Homer L. Kinsley, secretary; Dr. L. E. Sisler, vice-president of the Firestone Park Savings & Trust Co., treasurer.

Carolina Motor Supply Co. has been organized at Greensboro, N. C., for wholesale automobile accessory business. The business will be located at 120 North Davis street. The company is incorporated for \$100,000.

The Simoniz Co., 2116 Indiana avenue, Chicago, manufacturer of an automobile cleaning and polishing preparation, has added to its line

a product called Motorlife which is used in the gasoline or other fuel for the purpose of preventing formation of carbon in the combustion chambers.

Ray Puncture-Proof Tire Co. has moved from 332 South Michigan avenue to 3020 South Michigan avenue, Chicago.

Sterling Auto Devices Co., of Chicago, has moved its general offices and salesrooms to larger quarters at 208 South Green street.

Roy B. Thompson has been appointed receiver for the Triumph Truck & Tractor Co., Kansas City, Mo., distributor of parts for trucks and tractors, with property at Dearborn, Mo.

A branch of the Woodward Body Works has been opened at Dallas. John D. Woodall is manager of the plant. The company operates plants at Houston, San Antonio and Austin.

The Dallas Branch of the Sprague Tire & Rubber Co. has been incorporated.

At the directors' meeting of the Electric Auto-Lite Co. there was declared a \$1 per share dividend, payable July 2 to stockholders of record June 14. C. O. Miniger, president, made an exceedingly optimistic report. He said, "We will have built, by July 1, 80 per cent as many Auto-Lite starting, lighting and ignition equipments for motor cars as we built all of last year."

Directors of the Reynolds Spring Co., of Detroit, have elected two new members, John H. Merrell, vice-president of the Manhattan Rubber Mfg. Co., Chicago, and Herbert S. Reynolds, president of the Peoples National Bank of Jackson, to fill vacancies on the board. Dividends of 1 1/4 per cent were declared on both the Class A and B preferred stocks, payable July 1.

The White Co., sales subsidiary of the White Motor Co., has moved its foreign department from New York to Cleveland, and the name has been changed to the export department. Jay Rathbun is moving from New York to Cleveland as manager of the department.

Increased Gasoline Demand Causes Production to Jump

WASHINGTON, June 11—Increased demand for gasoline as the result of high production records in the automobile industry has resulted in increases in output of gasoline. Figures compiled by the Bureau of Mines show that the stock of gasoline on May 1 exceeded that of April by 77,000,000 gallons. Gasoline production for the month amounted to 619,042,667 gallons. Indicated consumption of gasoline in April amounted to 474,187,507 gallons, an increase of approximately 42,000,000 gallons over March and of 89,000,000 gallons over April, 1922. Gasoline consumption has not however, increased at as rapid a rate proportionately since February of this year as it did in 1922.

HEAD LENSES APPROVED

HARTFORD, Conn., June 11—The list of twenty-two makes of automobile headlight lenses as approved by a conference of motor vehicle departments heads, representing all of the New-England States, New York, New Jersey, Pennsylvania, Maryland and Ohio, has been announced by Secretary MacDonald.

This list, known as Class A, is as follows: Alpheco, 8 1/8-in. only; Bausch & Lomb, Benzer Type A, Brown (Reflector); Conaphore Type F. (Clear and amber colored); D. B. (Dodge Brothers, 8 5/8-in. only); Dillon Type I., Flintex, Ford H. (8 1/8-in. only) Guide Ray, Type A (Headlamp); Holophone No Tilt. Hudson (8 1/8-in. only) Lee Knight, Legalite N III., Liberty, Liberty Type D, Miro-Tilt (headlamp), Wills Sainte

Claire), Monogram (Durant, Grant, Maxwell, Oldsmobile, Overland, R & V, Rickenbacker, Sterns, Stutz, Velie, K. K.) Osgood B. 23, Patterson, Parab-O-Lite Type F. W., Smith.

There are four devices that the Conference has not been able to unanimously agree upon.

A Western conference has been called for the near future at which it is hoped that this standardizing work may be adopted by other states.

BIG OPEN CAR BUSINESS

SYRACUSE, N. Y., June 9—"Not since the boom period of 1920, have we had such fine business in open cars," says S. E. Ackerman, sales manager of the Franklin Automobile Company. "So far this year we have sold better than 600 more open cars than during the first five months of 1922 and better than 500 more than we sold during the corresponding period of 1921. Our present large business in open cars is, perhaps, the more remarkable in view of the fact that our production of closed cars today is far in advance of what it was three years ago."

DIRT RACE IN TEXAS

ABILENE, Tex., June 9—The program has been announced for a series of automobile races to be run on the dirt track here July 4 under the sanction of the Contest Board of the American Automobile Association. There will be five races for distances of from 5 to 15 miles. The largest prize is \$600 for first place in the 15-mile event. Other prizes are from \$350 down to \$20. Entries close June 20.

Work Started on Jewett Plant to Build 500 a Day

Vast Expansion Plan Includes Extensive Reorganization in Manufacture of Paige and Jewett

DETROIT, June 9—Work on the new Jewett plant of Paige-Detroit Motor Car Co. will be started at once, date for completion and occupation being fixed for about Nov. 1, permitting the company to be prepared for full production at about the first of the year. The plant will have a double assembly line with layout for most modern methods of material handling and will have capacity for 500 cars daily.

The erection of the new plant will result in extensive reorganization of present manufacturing plans on both Paige and Jewett models. The company is now occupying three plants in the city, the main factory being given over to Jewett assembly with capacity for about 200 daily, the former plant of Hinkley motors, recently bought, being used exclusively for Paige construction, and the engine plant in which the company builds all its Jewett engines.

When the new factory is constructed the assembly of Jewett will be transferred there, it being within short distance of the engine plant and favorably situated for receiving and shipping large volume of materials and finished cars. Paige construction will then be moved back to the present main plant, where the company will have a double assembly line capable of production of from 100 to 200 cars daily. No decision has been reached on the use of the Hinkley plant, but there is likelihood that the company will build some units now bought.

The company has disposed of all of its former truck inventory and the Paige truck is definitely discontinued. Truck construction was formerly carried on in a part of the engine plant now devoted exclusively to building Jewett motors. The truck material was sold to individual buyers.

CHECKER TO MAKE 15 A DAY

KALAMAZOO, Mich., June 9—A production of 15 chassis a day within the next three weeks is promised by W. L. Kroneberger, sales, service and advertising manager of the Checker Cab Manufacturing Co.

This concern, which recently purchased the local plants of the Handley Motors Corp. and the Dort Motor Car Co., is getting rapidly settled in its new quarters. The task of moving from Chicago is in full swing.

"KICK" INSURED FOR MILLION

DETROIT, June 11—The Rickenbacker Motor Co. announces that it has taken out with Lloyds of London a policy of \$1,000,000 on the life of Capt. E. V. Rickenbacker, payable only in case of accident or death while flying. The premium on this policy is said to amount to \$5000 a year.

IN THE RETAIL FIELD

The Hays Chevrolet Co. of Hattiesburg, Miss., was organized and incorporated the latter part of May with a capital of \$15,000, and will distribute the Chevrolet car in that section of Mississippi. B. T. Prestidge heads the company. C. M. Hays and others are his associates.

The Everett Brothers Motor Co. of Athens, Ga., was organized and incorporated the latter part of May with a capital stock of \$85,000, and has established a new automobile agency at Athens.

The Hill Motor Co. of Miami, Fla., is the name of a new automotive agency formed with \$150,000 capital, and headed by W. A. Hill as president. The Florida Motor Sales Co. is another new Florida agency formed in May at Sarasota, Fla., by Asa Cassidy and others, capital of the latter concern being \$100,000.

The Orlando Oakland Co. of Orlando, Fla., was organized and incorporated in May with a capital of \$25,000, and will distribute the Oakland car in the central eastern section of that state. The company is headed by C. E. Moore.

The Jack Phinizy Motor Co. has been organized in Atlanta and has established headquarters at 359 Peachtree street, taking over the Pierce-Arrow franchise as distributor for the state of Georgia. Jack Phinizy, head of the company, has been in the automobile business in Atlanta for 10 years.

Brown, Thomson & Co., Hartford, Conn., Cadillac distributor, is erecting a new four-story sales and service building on Temple street, which will be ready late this autumn.

Fred H. Reid, manager of the Central Machine Works, Sioux City, Ia., has taken the contract for the Stephens car in Sioux City and surrounding territory.

The Kipper Motor Co. has recently been organized in Sioux City, Ia. The firm will specialize in Ford service.

The Majestic Garage at Dubuque, Ia., has taken over the distribution of Overland cars in the surrounding territory.

George Wienold, president of the Wienold Motor Car Sales Co., Springfield, Ill., has been appointed distributor for the Hupmobile in the Sangamon county territory.

William F. Carter, Decatur, Ill., for the past ten years engaged in the tire and motor vehicle supply business in that city, died on June 1, after a brief illness.

The Peoria, Ill., Roamer Co. has been organized by N. A. Bolle and H. J. Bolle, and has opened a sales agency at 1516 Main street. The distribution territory comprises six counties of central Illinois, both for the Roamer and Barley cars.

Among the new automotive accessory companies formed in the southeast in May are the Joe Johnson Automobile Accessories and Equipment Co., of Titusville, Fla., with \$10,000 capital, and the Bob C. Smalley Co. of St. Petersburg, Fla., with \$50,000 capital.

The Beall-Watkins Motor Co. has been organized in Atlanta and opened headquarters at 257 Peachtree street, acting as retail dealers in Atlanta territory for the Hudson and Essex cars. Jack Watkins, in the automobile business in Atlanta for several years, heads the new company.

Among the new automotive agencies formed in the southeast in May are the State Automobile Co. of Columbus, S. C., with \$7,500 capital, and the Covington Motor Co. of Andalusia, Ala., with \$25,000 capital.

A. E. Peterson, for the past eight years associated with the Harrington Hudson Co., Hartford, Conn., distributor of the Hudson and Essex, has joined S. A. Miner, Inc., at 275 Connecticut Boulevard, East Hartford, associate dealer in Hudson and Essex and direct factory representative of the Pierce-Arrow. Peterson succeeds E. V. Vedder, who has resigned to go into business for himself in New York state.

The Boulevard Chevrolet Co. has been formed with headquarters at 275 Connecticut boulevard, East Hartford, to handle the Chevrolet, succeeding Harry Starkie, Inc., 1258 Main street, Hartford, Conn. David B. Roberts, proprietor of the Hartford Buick Co., is the head of the new organization.

The Cotter Garage, Hartford, Conn., has taken on the agency for the Corduroy tires.

T. C. Eades and C. E. Purcell, both of Streator, Ill., have formed a partnership and opened a garage and sales agency at Marseilles, Ill. They will distribute Ford cars in that territory. Purcell was formerly distributor of the Chalmers and Cleveland cars at Streator, while Eades was employed as salesman.

Samuel Clark of Sherrard, Ill., has filed a petition in bankruptcy. He has been operating

a garage and sales agency for several years. He schedules liabilities at \$41,298 and assets or \$10,616.

L. E. Lilly, Maxwell dealer at 7023 South Halsted street, Chicago, has purchased a new salesroom at 8035 South Halsted street, with a frontage of 75 feet.

Allison Rood Co., 2518 South Michigan avenue, Chicago, has appointed Leo A. Wolterding sales manager of the Winton division. This company also sells the Columbia.

North Side Motors Co., of Chicago, with three stores on upper Broadway, has appointed C. A. Rogers as manager of four of the lines handled by the company. These are the Durant, Star, Peerless and Oldsmobile.

North Side Nash Co. has been incorporated at St. Louis, Mo., by L. M. Pierce, H. D. Juenling and E. C. Heyde, to do a general automotive business.

Heidelberg Auto Co., Jackson, Miss., has been appointed Oldsmobile distributor in that section, T. M. Heidelberg being in active charge. The company formerly was Oldsmobile distributor there and is resuming the line.

The L. R. Filgo Motor Co., formerly at 505 Commerce street, Fort Worth, Tex., has moved to 1506 Young street, Dallas where, under the name of Filgo Motor Co., it will distribute Chandler and Cleveland cars.

Oldsmobile Sales Co. of Little Rock, Ark., has been named distributor for Olds in that territory. G. A. Marsh is in charge of the company.

Two additional local retail dealers for Maxwell-Chalmers cars have been appointed in Kansas City—the Armour-Troost Sales Co., Armour boulevard and Trost avenue, and the Russell Electric Co., 3310 Main street.

Velle distribution in Kansas City territory has been awarded to the recently organized Willis-Flack-Warner Co., and G. E. Anderson, formerly Velle division manager for the Gregory Motor Co., which has also had Cole distribution, is now representative of the Velle factory in a district including Kansas City, Omaha and Denver territories. The new Velle distributing company was organized by G. C. Willis, formerly owning the Willis Motor Co., Velle dealers at Topeka, Kan.; N. S. Flack, of Council Grove, Kan., and J. O. Warner, formerly Indiana truck distributor at Kansas City. Willis will give his time to the firm here, Warner being manager of sales. The Gregory Motor Co. continues as Cole distributor and retail dealer at Kansas City.

Construction has been started for a \$30,000 building at 432 St. Louis street, Springfield, Mo., and when completed the building will be occupied by the Thompson Racine Tire Co.

G. E. Austin has purchased the business property formerly owned by the Wellsville Hardware and Implement Co., Wellsville, Mo., and will remodel the first floor, converting it into an automobile salesroom.

The Chillicothe Auto Top Co., of Chillicothe, Mo., has leased the Tanner building and will move to the new location as soon as improvements on the building have been made. The rapid growth of the company has made it imperative to seek another location.

The O. K. Garage in Cameron, Mo., has been purchased from E. W. Wilder & Sons by I. J. Garvin and son, Raymond, the latter of Kansas City.

More than 350 Chevrolet owners and prospective owners attended the first service lecture of the Queen City Chevrolet Co., Cincinnati distributor, which was held at the retail store under the auspices of manager O. D. Keown. The purpose of these meetings, which will be held weekly, is to teach owners how best to maintain their cars. A. L. Hickson, service manager for the company, is leading the meetings.

George J. Willman, Cincinnati business efficiency expert, has been appointed assistant to Chris Urwick, president and general manager of the Winton Urwick Co., distributor of the Winton.

A feature of the opening of the enlarged showrooms of the Wilson Motor Car Co., St. Louis, Mo., the week of June 18, will be the display of a Haynes Blue Ribbon speedster which attracted attention at Indianapolis lately. The new address of the Wilson Company will be 2921 Locust street.

The baseball team of the Ward-Groff Motor Car Co., called the Cleveland Six, is leading the Independent division of the Municipal League in St. Louis, having won five games and lost none. William Groff is the team's manager.

The Mac-Dry Battery Co. has been formed in St. Louis, Mo., with C. L. Magann president

and manager, to distribute the Mac-Dry battery, which is made in Los Angeles, Calif. The company has opened sales and service rooms at 3917 Washington avenue.

The Bishop Automobile Co., Mercer distributor in St. Louis, has opened a new salesroom at the Delmar Garage, 5180 Delmar boulevard. The officers of the company are George Lawler, president; John Milliken, treasurer, and Carl Stolle, vice-president. The company is seeking the agency for a low priced machine to distribute in addition to the Mercer.

A new electric sign which the Newell Bros. Motor Car Co., Paige and Jewett distributors in St. Louis, have put on their building is 46 in. high, 50 ft. long and carries the name of the company in letters 25 in. high.

The Willys-Overland Limited, Toronto branch, recently conducted a salesmen's night school with classes three evenings a week for three weeks. No fee or tuition of any kind was charged. The men selected were given a complete course of instructions in the sale of automobiles.

Under the management of George Kingsley and C. W. Willis, the Studebaker automobile sales and service headquarters in Vancouver, B. C., will be located at 1027 Pender street west. Both members of the new firm, known as Willis Kingsley Motors, Limited, are former Vancouver island business men, Willis having been in the automobile and accessory trade in Vancouver for many years, while Kingsley until recently was associated with the mercantile business at Shannigan Lake.

The Lafayette-Phoenix Garage, Lexington, Ky., has transferred the agency for Chalmers and Maxwell cars to J. S. Taylor and Harry Tucker, who will do business as the Lafayette-Phoenix Sales Co., with offices on the third floor of the Lafayette-Phoenix Garage.

Tri-Plex Sales Co., of St. Louis, a distributing corporation of the Coupe De Luxe Body Co., has moved its salesroom from 3040 Locust street to 3145 Locust street. This is a consolidation of quarters with the factory branch which will facilitate the handling of orders.

The Hafter-Conlee Auto Sale Co., at 6500 Easton avenue, St. Louis, has been appointed agent for the Gray car by the Anderson-Strauss Co. M. B. Strauss, manager of Anderson-Strauss, says his company is planning to appoint six more associate dealers in various parts of the city.

Herbert Ellinwood, salesman at Kansas City for Pierce-Arrow and for Dodge distributors, has organized the Rickenbacker Kansas City Sales Co. for distribution of the Rickenbacker car in Kansas City territory, with headquarters at 2421 McGee street.

The Orthwein Motor Corporation, distributor of the Chevrolet in St. Louis, donated a Chevrolet sedan to the Tuberculosis Society of St. Louis as one of the presents to be given away at the benefit ball game on Flag Day, June 14, at Sportsman's Park.

The Sattille-Chevrolet Co., of Charleston, S. C., has been chartered for a general automobile business. Capital stock is \$15,000. Santo Sattille is president; Nick Sattille, vice-president and treasurer, and Albert Sattille, secretary.

Battison and Crawford, tire dealers of Houston, Tex., announce that Ted Jarvis has been made manager of the new main street store just opened.

The Cole Motor Car Co. of Indianapolis announces the appointment of the following as distributors of the Cole in their respective territories: C. N. More, Batavia, Ill.; F. O. Eddy, Beloit, Wis.; Garlett's Garage, Brownsville, Pa., and E. E. Peterson, Grand Forks, N. Dak.

The Boulevard Garage & Service Co., Cincinnati, William Pister, manager, is constructing an additional suite of offices.

Among new distributors for the Auburn car are the following: L. E. Tait Auto Co., 1640 "O" street, Lincoln, Neb., and the A. L. Bown Auto Co., 121-23 N. Market street, Van Wert, O.

The following concerns have been granted the Maxwell-Chalmers franchise: Crawford & Breece Motor Sales, Mechanic street, Red Bank, N. J.; Keller-Baker Motor Co., 308 E. 3rd street, Bartlesville, Okla.; R. C. Kaufman, Winslow, Ariz.; Ferguson Motor Car Co., 403 So. Chicago street, Joliet, Ill.; The Viaduct Motor Car Co., 1831 Kingshighway, St. Louis, Mo.; J. Leo Johnson, Main street, Hardwick, Vt.; Franklin Holyoke Corp., 69 Lincoln street, Holyoke, Mass., and the Derrick Bros., 3rd street, Clearfield, Pa.

Among new distributors and dealers for the Maxwell-Chalmers cars are the following: The Van Smith Motor Car Co., 211 W. 5th street, Austin, Tex.; Bronson's Garage of Main street, South Shaftsbury, Vt.; Pendleton Auto Co., 300 East Court street, Pendleton, Ore.; C. W. Dillon, 65-69 Portland street, Haverhill, Mass.; Mason & Taylor of Main street, Morganfield, Ky.; Princeton Machine Works, Water street, Princeton, Ind.; Eiting Bros. Garage, 1184 G avenue, Douglas, Ariz., and the Davis Motor Co., Atlantic, Ia.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

Prejudiced Generator Charges But Half the Battery

Q—I would like to get some information from you concerning a Ford with a Splitdorf starting and lighting system. Only one-half of the twelve volt battery stays charged, namely the one which supplies the current to the lights. What could be the trouble? Also let me know how a connection will have to be made if I want to connect a cutout and an ammeter instead of the automatic switch on this system, and what cutout should be used, a six or twelve volt? Send answer direct to me as soon as possible. Also what do I owe you for the advice?
—August Busshardt, Watertown, Wis.

You owe us nothing for the advice but we hope it will be worth a great deal more than that to you. This service is gladly furnished to our subscribers.

Perhaps however, you owe it to yourself to read MOTOR AGE a little more carefully. On page 45 of the May 10th issue you will find a wiring diagram showing Apelco system as taken from a Mitchell car and used on a 1912 White. The Apelco system is pretty much standardized and we believe you will find it substantially the same on your Ford car.

When the motor generator is being driven by the engine it is operating as a six volt generator so that a six volt cutout is suitable. Failure to have the other half of the battery charge is due to trouble in the series paralleling switch. Referring to this diagram in the May 10th issue you will notice that in the position shown the starting switch button is up and makes two contacts, one between the A minus and B minus terminal and the other from the A plus terminal to the terminal just above it which has no marks.

However, a bus bar connects this unmarked terminal to the B plus terminal. There are accordingly three possibilities, two being poor contact in the switch itself at the two places mentioned. The other possibility is that the bus bar is burnt out and in this case you can make an outside connection from the unmarked terminal around to the B plus terminal. If you think you locate the trouble as above suggested you can check it by turning on the lights and temporarily disconnecting the good side of the battery or the one which has been receiving a charge. The other side of the battery, assuming it is not too far down should then send current to the lights. If half of the battery has been allowed to stay discharged for any considerable length of time it would be well to give it a slow and thorough gassing charge at some battery station.

You may install an ammeter by cutting open the wire which goes from the

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

All questions are answered direct by letter, so the name and address should be given in full. This saves waiting for the answer to be published, which sometimes occurs several weeks late, depending upon the space available.

Readers' names will not be published with articles, if a request to this effect is received with the letter.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

A plus terminal on the switch to B plus terminal on the cutout and after cutting the wire connect one lead to each terminal of the ammeter. We believe that this answers your question but if there are any points that are not absolutely clear do not hesitate to get in touch with us again.

Removing Chandler Rear Wheels

Q—Will you give sketch or diagram showing how to remove ball bearing on a rear wheel of a 1921 Chandler car in order to remove the wheels. Are the axles of 1921 Chandler cars mounted on Timken bearings?

1—The rear axle drive shaft flange on each wheel is held in position against the center of the wheel by means of six acorn nuts. These will have to be removed before the rear axle drive shafts can be withdrawn. After the rear axle shafts have been removed the rear

wheels can be taken off by loosening the large nut and locking washer at the end of the rear axle housing. When the nut and washer have been removed the wheel can be withdrawn from the axle, bringing the wheel bearing with it. A steady even pressure should be exerted in order to start the wheel.

You will note that it is accordingly, not necessary to pull the bearing out by itself although this can be done, as in the method above described the bearing comes out when the wheel is pulled. If it is desirable to take the bearing out, it is necessary to remove the large locking nut which is threaded into the inside of the wheel hub. If this nut is removed, be sure to see that the same is tight against the bearings before re-installing the wheel.

When re-installing the wheel, after drawing up the nut on the outer end of the axle housing, and before installing the axle drive shaft, see that the wheel turns freely and then install the shaft, being careful to see, first of all, that the bearing is carefully packed with soft grease. Ball bearings are used in the rear wheels of the 1921 Chandler.

2—Show sketch of adjustment of Borg & Beck clutch as applied to this car.

2—Illustration of the Borg & Beck clutch, as used on a Lexington was given on page 102 of the January 25, 1923 issue of MOTOR AGE. The Borg & Beck clutch installation is practically the same in all cars and we would accordingly, suggest your referring to this issue.

3—How would you convert a Schrader air-gage into a cylinder compression tester?

3—Take an old spark plug and remove the porcelain. It will then be necessary to mount the gage in the spark plug shell in place of the porcelain, using, if possible, the old, copper gasket and the gland which normally held the porcelain in place. You may have to solder or braze on an extension shoulder on the gage in order to make it possible to clamp it in place and have a tight joint. The exact details depend on your ingenuity. If the gage is heated it should be taken apart and the rubber sleeve removed to avoid damaging it. Unscrewing the cap in the gage permits taking out the other parts.

4—While running in high gear a 1921 Chandler operates quietly but in second speed produces a great deal of noise. What is the cause of this?—R. F. Ernest, Arvada, Colo.

4—One possibility is that the teeth of the gear were somewhat soft and have worn so that they do not mesh perfectly. It is also possible that the sliding gears are a little loose on the shaft on which they slide, so that they chatter when operating. Also inspect for a spring spline shaft.

Architectural Service

IN giving architectural service, MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

How much of an accessory department is anticipated.

Wants Garage With Attractive Front

Q—I am sending my problem to you hoping that you can offer me some assistance. I wish to build a general garage consisting of a repair shop, filling station and service, automobile salesroom, accessories and general storage.

I would like to have the front of the garage very showy, with a place arranged for a filling station so that motorists can drive in from the street. I would like to have the automobile salesrooms in the front with show windows, and large enough for two cars. I also would like to carry a complete line of accessories and have an accessory show window to attract motorists as they drive up for gas or air. There will be two gas pumps.

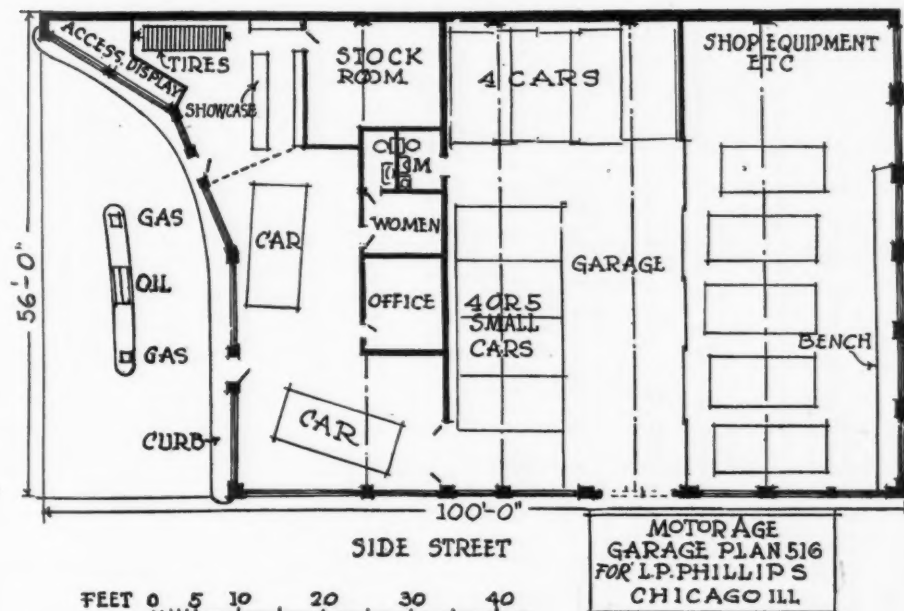
I intend to employ three or four mechanics in the repair shop, and would like the shop away from the general automobile storage so as to eliminate all possible dirt and grease from the storage cars. I also wish to have a place for washing cars. I would like to have a small but complete waiting room and toilet for women and toilet for men.

I have not figured just how many cars I could take care of, but was thinking of marking each stall by a cement curb made with the floor. This would eliminate all unnecessary crowding.—L. P. Phillip, Chicago, Ill.

A—We have made a layout for you as near as possible to the specifications you give in your letter but the specifications are really more complete than the space you possess and it will be absolutely necessary to either leave out something or economize in some way.

In the first place, the drive-in filling station, as it is placed, cuts very seriously into your 100 ft. depth, and in the next place the showroom for two cars, with plenty of space around them, takes out another big bite, so that by the time you have crowded back to the repair shop and garage, something has to lose. It will either be a question of crowding out the storage section of your garage or building on a second story for your repair shop. Of course, your situation and value of storage space will to a great extent, have to determine which will be better to leave out.

We have made storage space for at least eight cars but the room is so small that the movement of cars will be very difficult and from the tone of your letter we know that this is not desirable. You could, of course, extend the partition between the garage and shop clear



across, separating the two entirely and making the entrance doorway from the alley instead of from the garage. That would isolate your garage and make it entirely separate from the repair shop and get the desired effect except for the space.

We believe that if we were in your place we would throw out the filling sta-

tion and in that way gain 22 ft., which if added to the width of the garage, would make it very satisfactory. Our sketch shows a dotted line between the car showroom and the accessory store. If a partition is put here the accessory store can be operated along with the filling station while the rest of the business is locked up for the night.

WHY DO CONTACTS PIT UP EVERY 100 MILES?

Q—We would like to know what is wrong with the ignition system on a Briscoe car 1917 model. The breaker points become pitted about every 100 miles. After filing the contacts the ignition will work all right for a while. We installed a new coil but it did not help any.—Iowa Subscriber.

One possibility is that the contacts have burnt away until the layer of tungsten on the surface is practically gone so that the points are operating on the iron and consequently pit up and burn very rapidly. It is also possible that a cheap grade of contacts has been used in case the points have been replaced.

The Connecticut coil on this car is designed to operate with a Connecticut switch having in it a thermostat. The thermostat is intended to open the circuit in case the operator of the car forgets and leaves the switch turned on. This thermostat has in it a resistance which limits the current to the coil.

Accordingly, if the switch had been replaced, by some mechanic unfamiliar with the system, with an ordinary switch, you would be getting about 7.5 amperes to the coil instead of 5 amperes. The additional current would tend to burn the contacts very rapidly. We would say that there is possibility of a poorly connected condenser except that the condenser is in the coil and you say you have already tried another coil. You might, however, check up and see that the ground connection on the coil is clean as this might have some slight effect on the operation.

Another possibility is that there is a slightly poor connection between the generator and battery which throws a high voltage on the ignition. You can check this with a voltmeter taking readings from both sides of the ammeter to the frame of the car while the engine is running and generator charging the battery. If the battery voltage is 7 and the voltage at the ammeter about 7.5 you have a normal condition. However, if there is much more than half a volt difference between the battery voltage and the voltage from ammeter to ground, it would be well to explore further with a voltmeter and find out where the difference in voltage comes as this will indicate a poor connection.

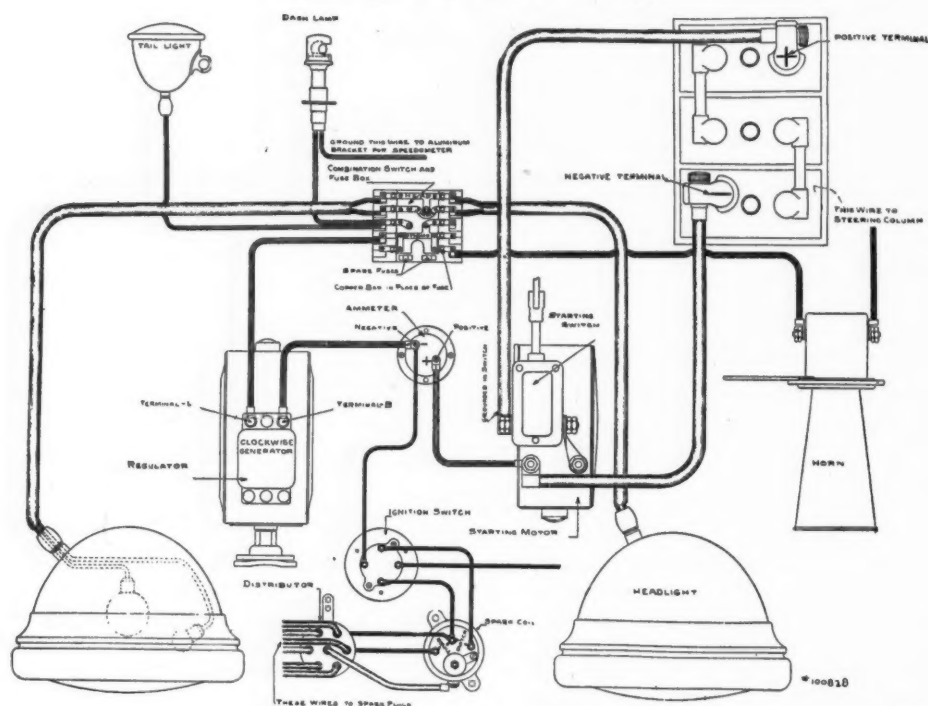
WHAT'S THE DIFFERENCE BETWEEN A 6 VOLT AND 12 VOLT AMMETER?

Q—Would like information on the following electrical problem. A customer came into my garage this spring with a Dodge car having an indicator on it which only showed "Off", "Charge" and "Discharge" and he wanted an ammeter which would read in amperes. We accordingly installed one of the kind suitable for this system but now it only shows charge of 2 amperes while the discharge with the lights on shows 3 amperes.

The ammeter is supposed to be suitable for the car and the motor generator works all right as a starter. Could it be that the electrical shop sent a wrong ammeter or is there no difference between the ammeter on a car using a 12 volt and on a car using a 6 volt battery?—A Subscriber, Cleveland, Wis.

This should be an easy problem for the Motor AGE electrical trouble shooters and we are leaving it up to them to answer.

Wiring of 1915-16 Paige



Q—The wiring and switch on a Paige 1915-16, 6-46 model with a Continental engine, is entirely destroyed. I have tried two makes of circuits but don't seem to be able to get a hot spark to the distributor. Do you have a copy of the original wiring diagram used for this car? It has

a Gray & Davis starter with switch mounted on top and a Gray & Davis generator with regulator cutout mounted on top and a Remy ignition distributor model 203.—E. N. Bush, Apt. S, Washington Apts., Albuquerque, New Mexico.

A wiring diagram of this car is shown.

WILL NO. 8 HIT ON FRONT TWO CYLINDERS

Q—We have here in the shop a Buick D-45-6-1917 model. This car fails to hit on the two front cylinders after it runs a few minutes. If the engine is shut off and then started again it will hit for a few revolutions and then start to miss. If left over night it will hit for about 5 minutes before it misses. The valves, ignition, carburetor and timer have all been examined and a new coil has been tried but with no improvement.

If the wires are removed from the rear four cylinders, the front two will fire slowly with the throttle almost wide open but with all the wires connected they will not fire. A set of new spark plugs has been tried with no improvement, the front cylinders still failing to fire. These cylinders do not seem to get enough gas and the intake manifold was examined to see if the passages were blocked. This car was running along smoothly and has been doing so for some time and suddenly started to behave as above explained.—J. A. Flaherty, Jr., Flaherty's Garage, Forsyth, Mich.

We suspect a burnt condition of the distributor cap in the vicinity of the No. 1 and No. 2 connections, which feeds high tension current to the No. 1 and No. 2 spark plugs. We suggest examining the cap to see if there are burnt spots which allow the spark to jump to ground or the casting of the interrupter. Also examine the distributor arm although trouble here should be noted on all cylinders.

With trouble of this nature it is absolutely essential to separate the trouble into ignition trouble or other trouble. If you do not readily see burnt spots in the distributor cap, would suggest accurately checking the spark in the No. 1 and No.

2 cylinders. If convenient use spark plug intensifiers in which the spark is visible, that is the type with the glass sleeve, on the No. 1 and No. 2 cylinders.

If these are not available take a piece of fiber or dry wood, bore a hole in a small slab of this wood and put a piece on No. 1 and No. 2 spark plugs. Then wire the No. 1 and No. 2 terminals on the rubber covered wires to these pieces of wood, so as to leave a gap of about $\frac{1}{8}$ in., which the spark will jump in getting to the spark plugs. Then, with the hood off the car, start the engine and observe these sparks jumping to the upper terminal of the spark plug. Then when No. 1 and No. 2 cylinders cut out watch carefully to see if the spark has also cut out. If so the trouble is ignition and if not it is elsewhere.

Due to the fact that No. 1 and No. 2 will fire when the other four wires are off we feel that the distributor button which rotates on a track in the distributor cap has worn grooves which are full of carbon or steel or other conducting substances and it is possible that, with all wires in place, the high tension spark which should go to No. 1 or 2 is leaking across to some other segment and jumping to ground at a spark plug where there is no compression in the cylinder. If a new distributor cap is available it should be tried and if not the old one should be carefully cleaned with fine sandpaper so as to remove all traces of conducting material from the track on which the rotating button revolves.

If this is the case the necessity of having the throttle wide open in order to make No. 1 and No. 2 cylinders fire may partly be due to the fact that the other cylinders are not helping and partly to the fact that there is some leakage in spite of the other four wires being off.

Just as a matter of precaution it might be well to check the compression roughly by cranking the engine by hand and feeling the effect of each cylinder after the engine has started to miss on the No. 1 and No. 2 cylinders. We doubt whether there is any trouble in the carburetion for it is unlikely that any obstruction could form or in any way get into the intake manifold without having the engine apart.

Referring again to the interrupter distributor mechanism, we would suggest that you check the distributor rotor and note whether it is equipped with a steel contact button. The steel contact button is regular equipment for the Delco apparatus but not infrequently some mechanics remove this button and install a carbon brush in its stead. Due to the closeness of adjacent contact points in the distributor cover raceway, a carbon brush if used will deposit a trail of carbon dust on the Bakelite between adjacent contacts, allowing a spark to go to that cylinder having the least compression. Remove the carbon brush and install the regular Delco steel contact button.

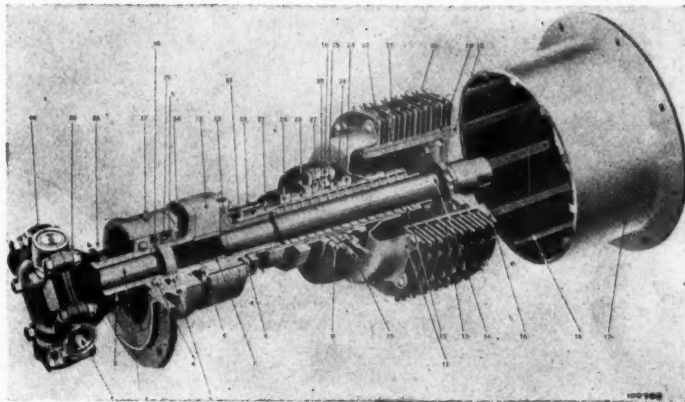
If after applying the previously mentioned ignition test the trouble is not located the next points of inspection will be with the fuel system.

The symptoms of the engine indicate trouble in the vacuum tank. A gasoline logged float will not shut off the vacuum valve and will allow gasoline to be drawn into the vacuum tank until it completely fills the upper tank and then overflows into the inlet manifold. This excess of gas may cause the missing you have noticed in the front cylinders because of the characteristics of the inlet manifold.

An easy method of testing the fuel system is to close off the vacuum tank connection at the inlet manifold and remove the vacuum tank cover and upper tank assembly. With these removed fill the vacuum tank with gasoline and start the engine. This will allow the vacuum tank to function as a plain gravity tank and if, with this arrangement, the engine hits on all six cylinders you are assured that the trouble is somewhere in the vacuum tank assembly.

If the vacuum tank float and flapper valve located at the bottom of the upper tank are in good condition it shows trouble in the valve mechanism in the tank cover, which should be replaced with a new one. Be sure that the vacuum tank connection at the inlet manifold is thoroughly closed before attempting the test outlined above. An easy way to stop the hole in the inlet manifold is to remove the pipe fitting and install a pipe plug in its stead. If the ignition and fuel system tests do not locate your trouble communicate with us at once and we shall offer further diagnosis.

Operation of Clutch on 1911 Packard



Q.—We have a Packard car 4-cylinder No. 16263, which we believe is a 1912 model. It is equipped with a disc clutch which is slipping. Advise if there is any way of tightening or setting up this clutch.—O. E. Rasmussen, Kenosha, Wis.

The car in question is a 1911 model 30, although the clutch in the 1911 and 1912 are practically identical. The illustration given shows the clutch which is a dry plate disc type. One possibility is that the pedal is striking the floorboard.

The clutch pedal in the engaged position, if properly adjusted, should have $\frac{1}{2}$ inch free motion or play when the pedal is lifted by hand. If the clutch pedal when in this position is allowed to touch the floor board the full action of the clutch spring is not obtained. The adjusting link for obtaining the correct adjustment of the clutch pedal is just inside of the clutch cover. By lengthening this link the pedal is brought closer to the floorboard and by shortening it the distance between the pedal and the

floorboard is increased. No other change from the original adjustment of the clutch is needed, as the clutch surfaces are automatic in their compensation for wear.

One possible cause of slipping is in excess oil from the forward clutch bearing working onto the plates and to overcome this condition it is desirable to wash out the clutch with gasoline. This can be done by removing the inspection cover and holding the pedal down, so that the plates will be held apart, and then squirting gasoline between the plates. Openings are provided in the bottom of the clutch housing for the gasoline to drain out. If proper pedal adjustment and washing of the plates does not overcome the condition it will be necessary to have new plates installed and these may be obtained from any Packard distributor.

It can be moved by jerks as little as $\frac{1}{4}$ in. or $\frac{1}{2}$ in. at a time. If the elbow is

bent the crank will either not move or will suddenly move 3 or 4 in. so that exact check on the timing is impossible.

The recommended clearance between valve stem and tappet is .006 in. The illustration given also shows the recommended valve timing for all half ton Vim trucks. With tappets properly set a piece of thin paper, such as cigarette paper, may be put between the valve stem and tappet while the valve is on its seat. This instruction might apply to the exhaust valve in number 1 or number 4 cylinder.

With the paper under the valve stem of the No. 4 exhaust valve the engine can be turned over until nearly on the firing position for No. 1 cylinder. On the flywheel both the dead center marks and the point at which the exhaust closes and intake opens are marked. Now turn the engine over until nearly on the No. 1 dead center firing position and then by the method previously described turn the crank a very small amount at a time, at the same time exert a slight pressure or pull on the tissue paper but not enough to tear it. As the crank is moved slowly a point will be reached where the tissue paper should just come out without tearing. At this point the exhaust closing mark on the flywheel should just be $1\frac{1}{4}$ in. past dead center as shown in the illustration.

In checking up with the Vim Motor Truck Co., of Ill., there was no order found where gears were ordered from Mattoon, Ill. There is accordingly a faint possibility that gears were installed which were not exactly suited to the engine and which might make it impossible to set the timing exactly. If this condition seems likely, it might be well to check up on this point and find out just what kind of gears were installed.

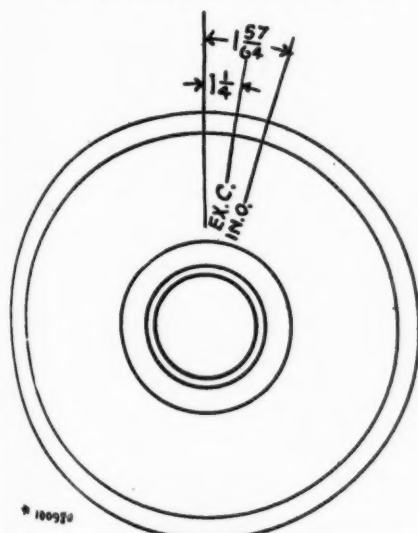
The idler gears are mounted on a stud attached to the crankcase by means of flanges and there is possibly a slight amount of motion so that the back lash can be adjusted. These idlers should not be set so that the gears bind as this will produce noise and possibly a slight amount of overheating.

You stated that you checked the magneto timing and it occurs to us as a possibility that the spark advance levers may be slipping at some point so that while the spark is apparently advanced, up on the steering wheel, it may do nothing to the magneto.

According to your statement the trouble occurred about four months ago and it seems possible that an anti-freeze solution may have been used which tended to clog up the radiator. If this is the case it is possible that the overheating is a coincidence rather than a direct effect of the change in timing gears. Checking with another radiator, which is known to give satisfactory operation on a similar Vim truck, would accordingly be advisable, if such a test can be made.

Another possibility is that the clutch is slipping thereby allowing the engine to run at abnormally high speed and making it overheat.

VALVE TIMING SUSPECTED WHEN TRUCK ENGINE OVERHEATS



Q.—A few days ago we wrote you relative to the heating of a Vim truck and since receiving your reply have checked the timing and have done as you instructed. We checked the timing, cleaned the cooling system, and inspected car generally. Also removed the pan and checked all bearings, also inspected tim-

ing gears and valve setting. The car does not seem to drag any place and has good power on the road.

One year ago this motor was overhauled, the cylinder blocks reground and new valves, pistons and rings installed. It was then driven about eight or ten months when by some accident new timing gears had to be installed. Since the new timing gears were put in the engine overheats and boils the water. This was not the case before the timing gears were renewed.

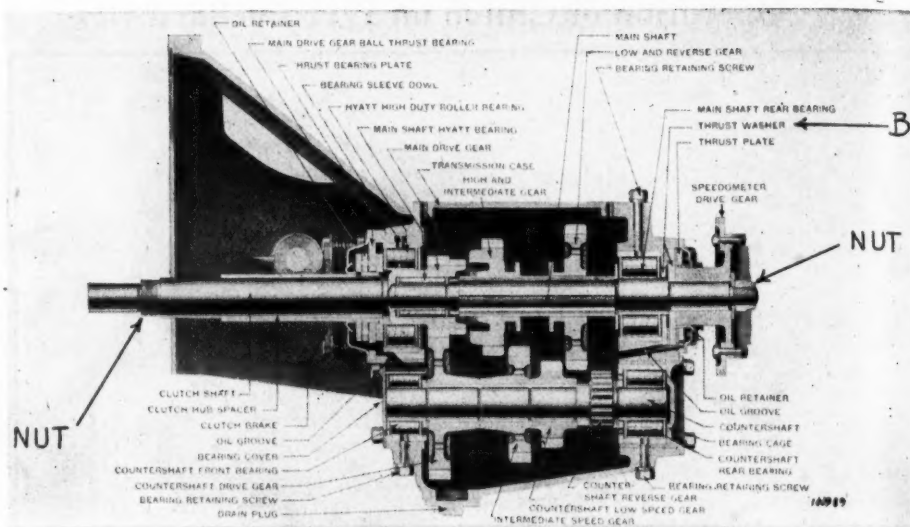
This is one of the stumblers in this town. There have been three of the largest garages working on this car and no one can locate the trouble. If you have any solution that might work we would be glad to have it as the owner is one of our best customers.—Automotive Garage, Mattoon, Ill.

At the time of writing you formerly we suggested checking the valve timing and ignition. It occurs to us that carefully checking the valve timing again would do no harm although we have one or two other suggestions to offer. To do this the spark plugs should be removed so that the engine can be turned a slight amount at a time. Some mechanics are not accustomed to turning an engine slowly and to do this it is well to use the starting crank and a sort of stiff arm motion throwing the whole weight of the body on the crank so that

Slips Out of High on a Pull

Q.—We have a Chalmers 1917 model 35A on which we have trouble with the high gear slipping out. We made up a sleeve and put it between the gear and the bearing washer and it worked fine for a while, but now it seems to slip out on the least grade. Have ordered and have on hand a new bearing and cup, as we thought there was too much up and down play and also end play, allowing the shaft to slide forward too far. The gears, both sliding and driving, have almost perfect teeth. Send instructions as to the proper assembling of the unit of transmission and clutch.—Chas. Brott, Elsinore, Calif.

1. Two illustrations are given, one showing the internal construction of the transmission and the other the outside appearance. On the sectional view the clutch shaft at the left is threaded and a nut is normally used to hold the clutch plate on. This point is indicated by an arrow and the word "nut", but the nut itself is not shown. One possibility is that this nut is loose and allows the clutch shaft to have considerable end play. This results in working the transmission shaft back and forth and causing the gear to work out of mesh.



is possible that the pointed portion of the pin, which engages with the shifting shaft, is rounded off so that it is no longer able to hold the gears in mesh.

REGULATOR MAY CAUSE VARIATION IN CHARGING RATE

Q.—We have a Gray & Davis generator, type T, No. 1823, that will not charge steadily at high speed. This generator is used on a 1915 Velle. This generator gives a steady charge at low speed but at high speed the ammeter needle vibrates between 10 and 15 amperes. This is what we have tried: have turned down the commutator in a lathe, put in new brushes, cleaned the regulator contacts with 00 sandpaper, also unglazed paper and have tried using a magneto file.

None of these things however gave any improvement in the operation. The contact points appear to be O. K. We took resistance of the generator and tested one coil at a time. On this test a 12 volt storage battery will light up a 6 volt 2 c.p. bulb to a dull red. We held one pair of regulating contacts open and connected 20 ft. of baling wire in place of the resistance but the ammeter needle went as far over as it could. We have tried to set the generator in accordance with the instructions setting one pair of contacts at a time but without results.—G. M. Elide, Decorah, Iowa.

This seems to be a case of regulator action due possibly to the tungsten or surface material of the contacts being burnt away or due to improper adjustment. Regulator adjustment is not always accomplished merely by changing the spring tension as the magnetic air gap has a great deal to do with satisfactory adjustment. From the description you give we assume that the contacts pull open and stay too long, in other words give time for the current to drop down from 15 amperes to 10 before the contacts come together again and build up the generator output.

Regulator adjustment is usually a matter of cut and try and we would suggest your setting the outer contact brackets away from the magnetic core as much as possible and then try adjusting the spring tension to get proper operation. You will then have a weak magnetic

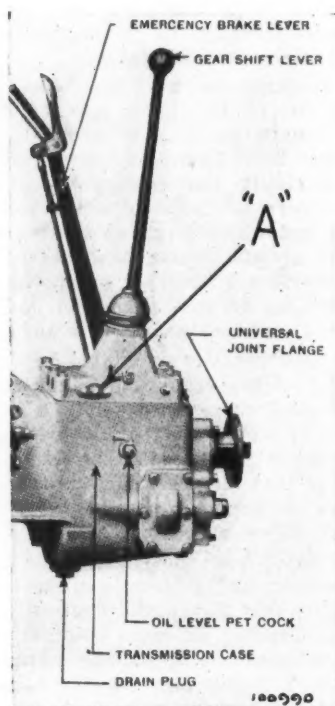
effect opposed by a weak spring action. The object is to get an adjustment where the magnetic effect does not suddenly increase in strength as the contacts are pulled open and a wider air gap may accomplish this. As stated, however, it is merely a matter of experiment and if this does not work you can then tap the outer contact brackets so as to close the air gap slightly and again try adjusting the spring tension.

If you will examine the edge of the contacts carefully perhaps cleaning them with a contact file you may see that the surface material has been burnt away and it may be necessary to install new contacts. Points such as are used on Ford coils would doubtless be satisfactory. Another possibility is that one or the other of the resistance units connected across the contacts is open circuited and you can test to see if this is the case. A sign of this however, would be very bad flashing at the regulator contacts.

A. C. OR D. C. SOUNDS SIMILAR BUT THE ACTION IS DIFFERENT

Q.—Never a week transpires without my gaining some valuable information from your "Readers' Clearing House" section and I now desire to have recourse to that section. We have a Ford equipped with a high tension magneto and on this same car we also have a storage battery which we charge by means of a rectifier. This battery operates the lights and horn. Can the polarity of the flywheel magneto be changed so that the magneto will generate D.C. instead of A.C. current? If so, about what will be the amperage and voltage of same at any given engine speed and could this current be used to charge a battery.—Milton Young, Lexington, Ky.

To the best of our knowledge there is nothing that can be done to change the nature of the current developed by a Ford flywheel type magneto. We have at times, heard of rectifiers that could be installed on the car but to the best of our knowledge none of these have been developed to the point where they are successful commercially and practically.



Another possibility is that the nut at the right which is holding the universal hub to the rear of the transmission shaft is loose and allows play at this point. Another possibility is that the thrust washers indicated by an arrow and the letter "B" are worn and allow some end play. These washers are made of bronze and to insure their being in good condition should be replaced.

Referring now to the outside view of the transmission, it will be seen that an arrow and letter "A" indicate the interlock mechanism, there being one of these on each side of the transmission. These should be removed and inspected, for it

Chalmers Entz O. K. on 6-Volts for Lighting Only

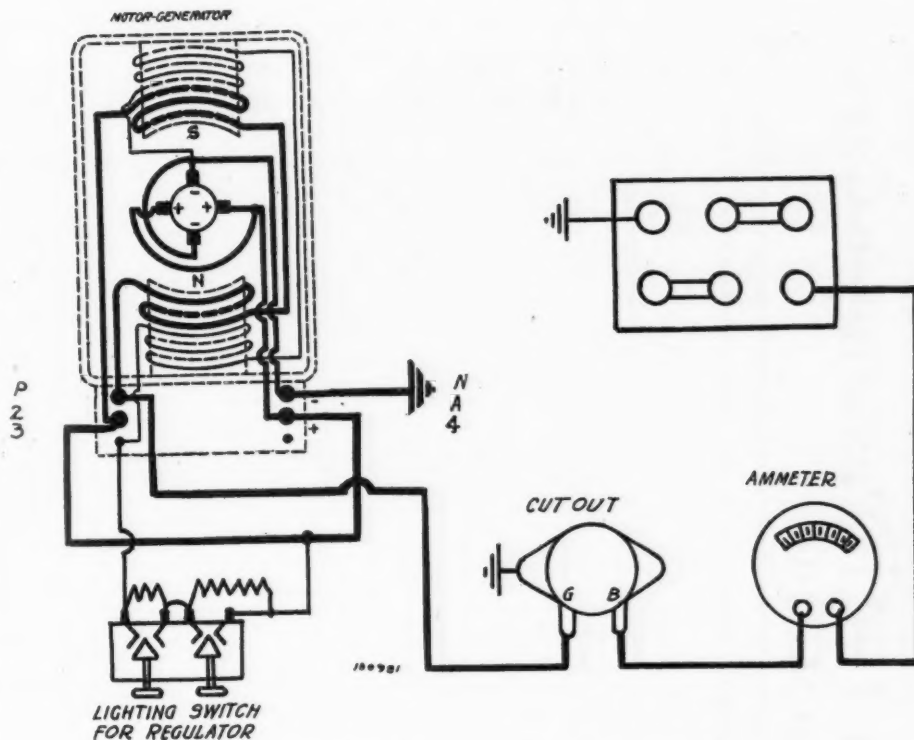
Q—I have a Chalmers model B-26 with an 18 volt battery and would like to use a 6 volt 11 plate battery. Could this generator be changed to be used with a 6 volt battery so as to have lights and ignition? The engine will be cranked by hand.—A. J. Reider, Luck, Wis.

It is no doubt possible to do this. Two diagrams are shown, one including a 6 volt battery, an ammeter, a cutout and a two gang lighting switch which, with resistance units on the back, is used to regulate the current.

You will notice that the terminals are marked P, 2, 3, N, A and 4.

One end of the field circuit is already connected to negative brush so we can simplify the circuits by grounding the N terminal. It may be that using the series field will help get some regulation so we next connect the positive or A terminal over to the No. 2 terminal and then connect the P terminal to the G terminal of the cutout. Note that the base plate of the cutout is to be grounded. This is a 6 volt cutout. Lights may be connected to cutout side of ammeter.

The rest of the circuit should be evident from the diagram. The lighting switch is an ordinary 2 gang switch on the back of which we have two resistance coils. These are made of either German silver or iron wire and the one at the right should have twice the length of wire as the left one. After wiring up this installation would suggest pushing in both switch buttons so as to give full field current. Next short circuit the two terminals of the cutout for an instant to



Chalmers-Entz electrical system used with 6-volt battery

make sure that the generator is magnetized in the right direction.

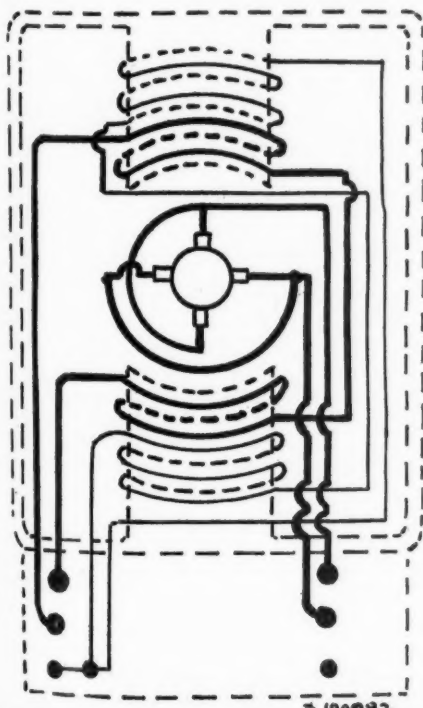
When first starting up it might be well to put the P and No. 2 wire on the same terminal so as to eliminate temporarily the series field. This will insure the generator building up in the right direction when the cutout terminals are shorted. After it has been found that the generator charges, the wires on the P and No. 2 terminal may be put back and may also be reversed as an experiment to see how much charging current is obtained.

One way the series field will be made to increase the output and the other way it will have the effect of reducing the current output of the generator. If the output is too great one or both of the buttons on the lighting switch may be pulled out so as to throw the resistance in series with the shunt field.

The machine as originally designed

operated on 18 volts and, as with this diagram we are using only 6 volts on the field, it is quite likely that the generator will only put out 2 or 3 amperes and that only at high speed. We accordingly show another diagram in which the shunt field is shown connected with the 2 coils in parallel, instead of in series. This involves taking the generator apart and cutting the connection between the two field coils. One of these connections will then have to be put on negative brush and the other will have to be brought out to the field terminal. Care should be used to connect up exactly as shown in the second diagram.

Theoretically this will make the shunt field exactly right for 9 volts and as we intend to operate on 6 volts it should not be far wrong and for your purpose of supplying current for light and ignition should be satisfactory.



Entz generator shunt fields parallel connected for 6-volt operation

READER'S METHOD OF REPLACING CLUTCH DISC ON 1918 BUICK

In the MOTOR AGE of January 18th, 1923 we find that John L. Fox's method of replacing clutch discs on a 1918 Buick model E-44 requires too much labor. Having worked on Buick cars exclusively for a number of years we find it an easy matter to change clutch discs in five hours by the following method which we have developed.

- 1st. Disconnect rear axle assembly.
- 2nd. Take off lower half of flywheel housing.
- 3rd. Remove nuts which hold transmission to engine crankcase, this will allow you to slide transmission off easily.
- 4th. Remove the three nuts which hold

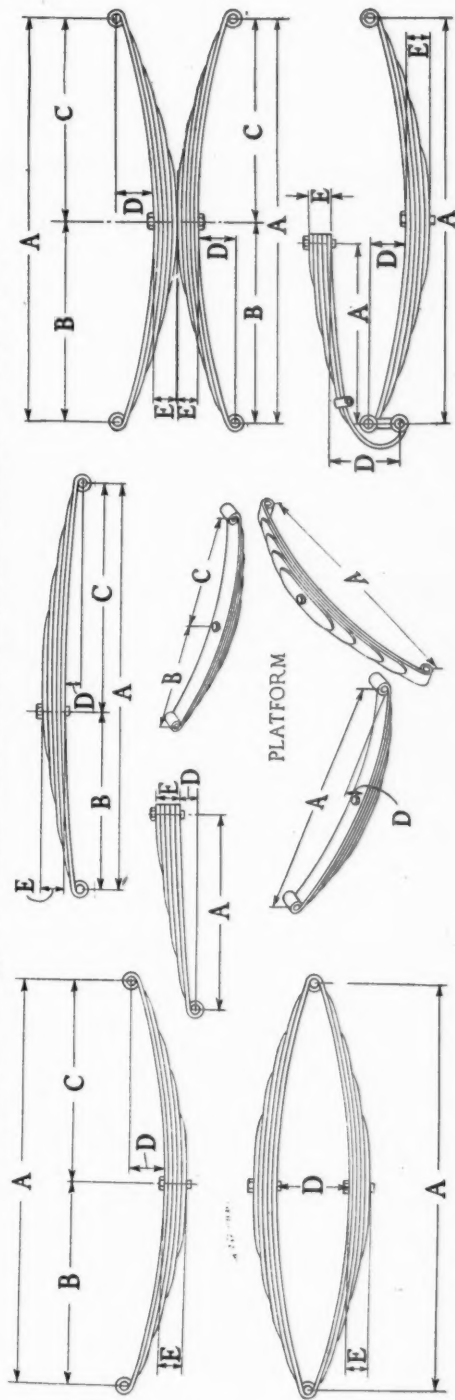
the clutch to flywheel drive studs. This will allow you to take the clutch assembly out.

It is an easy matter for any mechanic experienced in this line of work to replace linings or any worn parts. The only reason that we can see in Mr. Fox's method of removing motor to do this job is that he had considerable trouble in removing flywheel drive studs. This, however, in our estimation is an easy matter by taking off the three burrs at front side of the flywheel by the use of a large open end wrench. Then use a bar or punch to drive the studs out.—Tony A. Walk, Antigo, Wis.

Motor Age wishes to express appreciation for the above letter. It should prove of interest to many of MOTOR AGE readers.

Spring Data and Dimensions for 1920-1921-1922 Passenger Cars

Motor Age Maintenance Data Sheet No. 197



NOTE:—† Dimension "D" is given with spring free; i. e., weight — car off.

MAKE AND MODEL	Year	Body Style	FRONT SPRINGS										REAR SPRINGS										MAKE AND MODEL																										
			Dimensions (Inches)					Leaves					Shackle Bolts					Dimensions (Inches)						Leaves					Shackle Bolt																				
			Type	A	B	C	D†	E	No.	Width (Ins.)	Diam. (Ins.)	Rear	Are Eyes Bushed?	Type	A	B	C	D	E	No.	Width (Ins.)	Diam. (Ins.)		Rear	Are Eyes Bushed?	Type	A	B	C	D	E	No.	Width (Ins.)																
Ambassador.....	1921-22	4 Tour	40	19	21	15 1/2	2 1/2	9	2 1/4	5/8	Yes	1 1/2 ELL	58 3/4	27 1/2	31 1/4	1 1/2	28 1/2	8	2 1/2	3/4	Yes	Yes	R	Ambassador.....	1921-22	4 Tour	40	19	21	15 1/2	2 1/2	9	2 1/4	5/8	Yes	1 1/2 ELL	58 3/4	27 1/2	31 1/4	1 1/2	28 1/2	8	2 1/2	3/4	Yes	Yes	R		
Ambassador.....	1921-22	7 Tour	40	19	21	15 1/2	2 1/2	9	2 1/4	5/8	Yes	1 1/2 ELL	58 3/4	27 1/2	31 1/4	1 1/2	28 1/2	9	2 1/2	3/4	Yes	Yes	R	Ambassador.....	1921-22	7 Tour	40	19	21	15 1/2	2 1/2	9	2 1/4	5/8	Yes	1 1/2 ELL	58 3/4	27 1/2	31 1/4	1 1/2	28 1/2	9	2 1/2	3/4	Yes	Yes	R		
American.....	1921-22	All	39	16 1/2	19 1/2	1 1/2	1 1/2	8	2 1/4	5/8	Yes	1 1/2 ELL	57 1/2	27 1/4	31 1/4	1 1/2	28 1/2	8	2 1/2	3/4	Yes	Yes	C	American.....	1921-22	All	39	16 1/2	19 1/2	1 1/2	1 1/2	8	2 1/4	5/8	Yes	1 1/2 ELL	57 1/2	27 1/4	31 1/4	1 1/2	28 1/2	8	2 1/2	3/4	Yes	Yes	C		
Apperson.....	1920-21-22	All	36	16 1/2	19 1/2	4 5/8	1 1/2	6	2 1/4	5/8	Yes	3/4 ELL	48	24	24	7 1/4	1 1/4	28 1/2	9	2	5/8	Yes	Yes	30-40	Apperson.....	1920-21-22	All	36	17	17	4 5/8	1 1/2	6	2 1/4	5/8	Yes	3/4 ELL	48	24	24	7 1/4	1 1/4	28 1/2	9	2	5/8	Yes	Yes	30-40
Auburn.....	1920-21	All	36	16 1/2	19 1/2	2 3/4	1 1/2	7	2	5/8	Yes	1 1/2 ELL	54	27	27	8 1/2	2	2	8	2	5/8	Yes	Yes	6-39	Auburn.....	1920-21	All	36	16 1/2	19 1/2	2 3/4	1 1/2	7	2	5/8	Yes	1 1/2 ELL	54	27	27	8 1/2	2	2	8	2	5/8	Yes	Yes	6-39
Auburn.....	1921	All	38 3/4	17 1/4	20 3/4	3 1/4	2 1/2	8	2	5/8	Yes	1 1/2 ELL	56	27	29	8	2 1/2	2 1/2	8	2	5/8	Yes	Yes	6-51	Auburn.....	1921	All	38 3/4	17 1/4	20 3/4	3 1/4	2 1/2	8	2	5/8	Yes	1 1/2 ELL	56	27	29	8	2 1/2	2 1/2	8	2	5/8	Yes	Yes	6-51
Auburn.....	1922	All	38 3/4	17 1/4	20 3/4	3 1/4	2 1/2	8	2	5/8	Yes	1 1/2 ELL	56 1/2	27	29 1/2	8	2 1/2	2 1/2	8	2	5/8	Yes	Yes	6-51	Auburn.....	1922	All	38 3/4	17 1/4	20 3/4	3 1/4	2 1/2	8	2	5/8	Yes	1 1/2 ELL	56 1/2	27	29 1/2	8	2 1/2	2 1/2	8	2	5/8	Yes	Yes	6-51
Biddle.....	1920-21-22	All	38 1/4	18 1/2	20 1/4	0	2	7	2 1/4	3/4	Yes	1 1/2 ELL	59	29 1/4	29 3/4	0	28 1/2	8	2 1/2	3/4	Yes	Yes	B1 & B5	Biddle.....	1920-21-22	All	38 1/4	18 1/2	20 1/4	0	2	7	2 1/4	3/4	Yes	1 1/2 ELL	59	29 1/4	29 3/4	0	28 1/2	8	2 1/2	3/4	Yes	Yes	B1 & B5		
Brewster.....	1920-21-22	All	38	17 1/2	20 1/4	3 3/8	1 1/2	10	2	5/8	Yes	1 1/2 ELL	53 3/4	27	26 3/4	3 3/4	3 1/2	28 1/2	11	2 1/2	3/4	Yes	Yes	Brewster.....	1920-21-22	All	38	17 1/2	20 1/4	3 3/8	1 1/2	10	2	5/8	Yes	1 1/2 ELL	53 3/4	27	26 3/4	3 3/4	3 1/2	28 1/2	11	2 1/2	3/4	Yes	Yes	Brewster.....	
Brice.....	1920-21	All	36	17	19	2	1 1/2	7	2 1/4	5/8	Yes	1 1/2 ELL	53	27	26	6 1/4	2 1/2	28 1/2	8	2 1/2	3/4	Yes	Yes	Brice.....	1920-21	All	36	17	19	2	1 1/2	7	2 1/4	5/8	Yes	1 1/2 ELL	53	27	26	6 1/4	2 1/2	28 1/2	8	2 1/2	3/4	Yes	Yes	Brice.....	
Buck.....	1922	34-6	36	19	17	3 3/8	1 1/2	7	2 1/4	5/8	Yes	1 1/2 ELL	55 1/2	28 1/4	29 1/4	6 1/2	1 1/2	28 1/2	8	2 1/2	3/4	Yes	Yes	Buck.....	1922	34-6	36	19	17	3 3/8	1 1/2	7	2 1/4	5/8	Yes	1 1/2 ELL	55 1/2	28 1/4	29 1/4	6 1/2	1 1/2	28 1/2	8	2 1/2	3/4	Yes	Yes	Buck.....	
Buck.....	1922	35	36	19	17	3 3/8	1 1/2	7	2 1/4	5/8	Yes	1 1/2 ELL	55 1/2	28 1/4	29 1/4	6 1/2	1 1/2	28 1/2	9	2 1/2	3/4	Yes	Yes	Buck.....	1922	35	36	19	17	3 3/8	1 1/2	7	2 1/4	5/8	Yes	1 1/2 ELL	55 1/2	28 1/4	29 1/4	6 1/2	1 1/2	28 1/2	9	2 1/2	3/4	Yes	Yes	Buck.....	
Buck.....	1922	37	36	19	17	3 3/8	1 1/2	10	2	5/8	Yes	1 1/2 ELL	48	21	27	4 1/2	2 1/2	28 1/2	11	2 1/2	3/4	Yes	Yes	Buck.....	1922	37	36	19	17	3 3/8	1 1/2	10	2	5/8	Yes	1 1/2 ELL	48	21	27	4 1/2	2 1/2	28 1/2	11	2 1/2	3/4	Yes	Yes	Buck.....	
Buck.....	1922	44	36 1/2	19 1/2	17	2 1/2	1 1/2	13	2	5/8	Yes	1 1/2 ELL	48	21	27	4 1/2	3 1/2	28 1/2	14	2 1/2	3/4	Yes	Yes	Buck.....	1922	44	36 1/2	19 1/2	17	2 1/2	1 1/2	13	2	5/8	Yes	1 1/2 ELL	48	21	27	4 1/2	3 1/2	28 1/2	14	2 1/2	3/4	Yes	Yes	Buck.....	
Buck.....	1922	45-7-8	36 1/2	19 1/2	17	3 1/4	1 1/2	11	2	5/8	Yes	1 1/2 ELL	48	21	27	4 1/2	3 1/2	28 1/2	14	2 1/2	3/4	Yes	Yes	Buck.....	1922	45-7-8	36 1/2	19 1/2	17	3 1/4	1 1/2	11	2	5/8	Yes	1 1/2 ELL	48	21	27	4 1/2	3 1/2	28 1/2	14	2 1/2	3/4	Yes	Yes	Buck.....	
Buck.....	1922	46-50	36 1/2	19 1/2	17	3 1/4	1 1/2	13	2	5/8	Yes	1 1/2 ELL	48	21	27	4 1/2	3 1/4	28 1/2	14	2 1/2	3/4	Yes	Yes	Buck.....	1922	46-50	36 1/2	19 1/2	17	3 1/4	1 1/2	13	2	5/8	Yes	1 1/2 ELL	48	21	27	4 1/2	3 1/4	28 1/2	14	2 1/2	3/4	Yes	Yes	Buck.....	
Buck.....	1922	49	36 1/2	19 1/2	17	3 1/4	1 1/2	13	2	5/8	Yes	1 1/2 ELL	48	21	27	4 1/2	3 1/4	28 1/2	14	2 1/2	3/4	Yes	Yes	Buck.....	1922	49	36 1/2	19 1/2	17	3 1/4	1 1/2	13	2	5/8	Yes	1 1/2 ELL	48	21	27	4 1/2	3 1/4	28 1/2	14	2 1/2	3/4	Yes	Yes	Buck.....	
Case.....	1921-22	All	39 1/2	18	21 1/2	2 1/2	2 1/2	7	2	3/4	Yes	1 1/2 ELL	54 1/2	27 1/4	27 1/4	6 1/2	28 1/2	8	2 1/2	3/4	Yes	Yes	V	Case.....	1921-22	All	39 1/2	18	21 1/2	2 1/2	2 1/2	7	2	3/4	Yes	1 1/2 ELL	54 1/2	27 1/4	27 1/4	6 1/2	28 1/2	8	2 1/2	3/4	Yes	Yes	V		
Case.....	1921-22	All	38 1/2	17 1/2	20 3/4	3 1/2	0	10	2	5/8	Yes	1 1/2 ELL	53 1/2	27 1/4	28 1/4	5 1/2	1 1/2	28 1/2	7	2 1/2	3/4	Yes	Yes	X	Case.....	1921-22	All	38 1/2	17 1/2	20 3/4	3 1/2	0	10	2	5/8	Yes	1 1/2 ELL	53 1/2	27 1/4	28 1/4	5 1/2	1 1/2	28 1/2	7	2 1/2	3/4	Yes	Yes	X
Chandler.....	1920-21-22	All	40	18	22	2	2 1/2	10	2	5/8	Yes	1 1/2 ELL	58 1/2	27 1/4	31 1/2	5 1/2	0	28 1/2	8	2 1/2	3/4	Yes	Yes	Chandler.....	1920-21-22	All	40	18	22	2	2 1/2	10	2	5/8	Yes	1 1/2 ELL	58 1/2	27 1/4	31 1/2	5 1/2	0	28 1/2	8	2 1/2	3/4	Yes	Yes	Chandler.....	
Chandler.....	1920-21-22	Tok&Se	40	18	22	2	2 1/2	10	2	5/8	Yes	1 1/2 ELL	58 1/2	27 1/4	31 1/2	5 1/2	0	28 1/2	8	2 1/2	3/4	Yes	Yes	Chandler.....	1920-21-22	Tok&Se	40	18	22	2	2 1/2	10	2	5/8	Yes	1 1/2 ELL	58 1/2	27 1/4	31 1/2	5 1/2	0	28 1/2	8	2 1/2	3/4	Yes	Yes	Chandler.....	
Chrysler.....	1920-21-22	All	22 1/2	18	22	2	2 1/2	10	1 1/4	None	None	1 1/2 ELL	29 1/2	24	28	1 1/2	28 1/2	8	2 1/2	3/4	Yes	Yes	490	Chrysler.....	1920-21-22	All	22 1/2	18	22	2	2 1/2	10	1 1/4	None	None	1 1/2 ELL	29 1/2	24	28	1 1/2	28 1/2	8	2 1/2	3/4	Yes	Yes	490		
Cleveland.....	1920-21-22	Sedan	38	18	20	2	2 1/2	9	2	5/8	Yes	1 1/2 ELL	52	24	28	1 1/2	28 1/2	7	2	3/4	Yes	Yes	490	Cleveland.....	1920-21-22	Sedan	38	18	20	2	2 1/2	9	2	5/8	Yes	1 1/2 ELL	52	24	28	1 1/2	28 1/2	7	2	3/4	Yes	Yes	490		
Cleveland.....	1920-21-22	Tok&Co	38	18	20	2	2 1/2	9	2	5/8	Yes	1 1/2 ELL	52	24	28	1 1/2	28 1/2	7	2	3/4	Yes	Yes	490	Cleveland.....	1920-21-22	Tok&Co	38	18	20	2	2 1/2	9	2	5/8	Yes	1 1/2 ELL	52	24	28	1 1/2	28 1/2	7	2	3/4	Yes	Yes	490		
Cleveland.....	1920-21-22	Road	38	18	20	2	2 1/2	9	2	5/8	Yes	1 1/2 ELL	52	24	28	1 1/2	28 1/2	7	2	3/4	Yes	Yes	490	Cleveland.....	1920-21-22	Road	38	18	20	2	2 1/2	9	2	5/8	Yes	1 1/2 ELL	52	24	28	1 1/2	28 1/2	7	2	3/4	Yes	Yes	490		
Cleveland.....	1920-21-22	Sedan	38	18	20	2	2 1/2	9	2	5/8	Yes	1 1/2 ELL	52	24	28	1 1/2	28 1/2	7	2	3/4	Yes	Yes	490	Cleveland.....	1920-21-22	Sedan	38	18	20	2	2 1/2	9	2	5/8	Yes	1 1/2 ELL	52	24	28	1 1/2	28 1/2	7	2	3/4	Yes	Yes	490		
Cole.....	1920	All	39	20 1/2	18 1/2	2 1/2	2 1/2	8	2 1/4	5/8	Yes	1 1/2 ELL	57 1/2	31 1/4	26 1/4	7 1/2	28 1/2	9	2 1/4	3/4	Yes	Yes	870	Cole.....	1920	All	39	20 1/2	18 1/2	2 1/2	2 1/2	8	2 1/4	5/8	Yes	1 1/2 ELL	57 1/2	31 1/4	26 1/4	7 1/2	28 1/2	9	2 1/4	3/4	Yes	Yes	870		
Cole.....	1920	Sedan	39	20 1/2	18 1/2	1 1/2	1 1/2	7	2 1/4	5/8	Yes	1 1/2 ELL	57 1/2	31 1/4	26 1/4	7 1/2	28 1/2	9	2 1/4	3/4	Yes	Yes	870	Cole.....	1920	Sedan	39	20 1/2	18 1/2	1 1/2	1 1/2	7	2 1/4	5/8	Yes	1 1/2 ELL	57 1/2	31 1/4	26 1/4	7 1/2	28 1/2	9	2 1/4	3/4	Yes	Yes	870		
Cole.....	1921	All	39	20 1/2	18 1/2	2 1/2	2 1/2	8	2 1/4	5/8	Yes	1 1/2 ELL	57 1/2	31 1/4	26 1/4	7 1/2	28 1/2	9	2 1/4	3/4	Yes	Yes	880	Cole.....	1921	All	39	20 1/2	18 1/2	2 1/2	2 1/2	8	2 1/4	5/8	Yes	1 1/2 ELL	57 1/2	31 1/4	26 1/4	7 1/2	28 1/2	9	2 1/4	3/4	Yes	Yes	880		
Cole.....	1921																																																

NOTE—†† Dimension "D" is given with spring free; i. e., weight - car off.

MAKE AND MODEL	Year	Body Style	FRONT SPRINGS										REAR SPRINGS										MAKE AND MODEL								
			Dimensions (Inches)					Leaves					Shackle Bolts		Dimensions (Inches)					Leaves					Shackle Bolt						
			A	B	C	D††	E	No.	Width (Ins.)	Diam.	Are Eyes Bushed?	A	B	C	D	E	No.	Width (Ins.)	Diam.	Are Eyes Bushed?	Type	A		B	C	D	E	No.	Width (Ins.)	Diam.	Are Eyes Bushed?
Cole.....870	1922	Sedan	39	20 1/2	18 1/2	1 1/2	11 1/2	7	2 1/2	5/8	5/8	Yes	1 1/2 ELL	57 1/2	31 1/4	29 1/4	7 1/2	2 1/2	9	2 1/4	3/4	5/8	Yes	870							
Cummet.....C-53	1922	All	36	20	16	1 1/2	13 1/2	7	2 1/2	5/8	5/8	Yes	1 1/2 ELL	58	29	29	7 1/2	2	8	2 1/4	3/4	5/8	Yes	C-53							
Cunningham.....V-4	1920-21-22	All	40	18	22	3 1/2	2 1/2	9	2 1/2	5/8	5/8	Yes	3 1/2 ELL	102	29	29	18 1/2	2 1/2	9	2 1/2	None	5/8	Yes	V-4							
Daniels.....D19	1922	All	40	20	20	3 1/2	2 1/2	7	1 1/2	5/8	5/8	Yes	1 1/2 ELL	60	30 1/2	29 1/2	18 1/2	2 1/2	9	2	1 1/2	5/8	Yes	D19							
Dixie Flyer.....HS	1920-21-22	All	36 1/2	17	19 1/2	3 1/2	2 1/2	7	1 1/2	5/8	5/8	No	1 1/2 ELL	50 1/2	25 1/4	25 1/4	17 1/2	1 1/2	9	2	1 1/2	5/8	No	HS							
Dodge Brothers.....	1920-21-22	All	35 1/2	15 1/2	20 1/2	3 1/2	2 1/2	6	1 1/2	1 1/2	1 1/2	Yes	3 1/2 ELL	45	22 1/2	22 1/2	19 1/4	2 1/2	5	2	None	1 1/2	Yes								
Dorris.....6-80	1921-22	All	30 1/2	17 1/2	21 1/2	1 1/2	1 1/2	7	2 1/4	7/8	7/8	Yes	1 1/2 ELL	60	30	30	1 1/2	2 1/2	7	2 1/2	1 1/2	None	Yes	6-80							
Dort.....15	1920	All	37	18 1/2	18 1/2	2 1/2	2 1/2	7	2	7/8	7/8	Yes	1 1/2 ELL	48 1/2	22 1/2	22 1/2	3 1/4	2 1/2	7	2 1/4	1 1/2	None	Yes	15							
Dort.....17	1921-22	All	37	18 1/2	18 1/2	2 1/2	2 1/2	7	2 1/4	1 1/2	1 1/2	Yes	1 1/2 ELL	48 1/2	22 1/2	22 1/2	3 1/4	2 1/2	7	2 1/4	1 1/2	None	Yes	17							
Duesenberg.....8	1922	All	39	18	21	3 1/2	2 1/2	12	2 1/4	1 1/2	1 1/2	Yes	1 1/2 ELL	50	30	20	1 1/2	2 1/2	7	2 1/4	1 1/2	None	Yes	8							
Duesenberg.....A-22	1922	All	39	18	21	3 1/2	2 1/2	12	2 1/4	1 1/2	1 1/2	Yes	1 1/2 ELL	50	30	20	1 1/2	2 1/2	7	2 1/4	1 1/2	None	Yes	A-22							
Durant.....A-22	1922	All	33 1/2	15 1/2	17 1/2	2 1/2	2 1/2	6	2	5/8	5/8	Yes	1 1/2 ELL	48	24	24	6 1/2	2 1/2	10	2 1/4	5/8	5/8	Yes	A-22							
Durant.....B-22	1922	All	36 1/4	17	19 1/2	1 1/2	1 1/2	8	2	5/8	5/8	Yes	1 1/2 ELL	50 1/2	27 1/2	28 1/2	7 1/2	2 1/2	10	2 1/4	5/8	5/8	Yes	B-22							
Earl.....40	1922	All	36	17	19	1 1/2	1 1/2	7	1 1/2	5/8	5/8	Yes	1 1/2 ELL	53 1/2	27 1/2	27 1/2	1 1/2	2 1/2	8	1 1/2	5/8	5/8	Yes	40							
Earl.....40	1922	All	36	17	19	1 1/2	1 1/2	7	1 1/2	5/8	5/8	Yes	1 1/2 ELL	53 1/2	27 1/2	27 1/2	1 1/2	2 1/2	8	1 1/2	5/8	5/8	Yes	40							
Elcar.....4	1920	All	34	16 1/2	18 1/2	4 1/2	1 1/2	7	2	5/8	5/8	No	1 1/2 ELL	50 1/2	28 1/2	28 1/2	5 1/2	2 1/2	7	2 1/2	5/8	5/8	No	4							
Elcar.....4	1921-22	All	35	16 1/2	18 1/2	4 1/2	1 1/2	8	2	5/8	5/8	No	1 1/2 ELL	51	28 1/2	28 1/2	5 1/2	2 1/2	7	2 1/2	5/8	5/8	No	4							
Elcar.....6	1920	All	34	16 1/2	17 1/2	4 1/2	1 1/2	7	2	5/8	5/8	No	1 1/2 ELL	50 1/2	28 1/2	28 1/2	5 1/2	2 1/2	7	2 1/2	5/8	5/8	No	6							
Elcar.....6	1921-22	All	35	16 1/2	18 1/2	4 1/2	1 1/2	8	2	5/8	5/8	No	1 1/2 ELL	51	28 1/2	28 1/2	5 1/2	2 1/2	7	2 1/2	5/8	5/8	No	6							
Essen.....T	1920-21-22	All	36	17	19	1 1/2	1 1/2	6	2	5/8	5/8	Yes	1 1/2 ELL	54	26	26	1	2 1/2	8	2	5/8	5/8	Yes	T							
Ford.....Franklin	1920-21-22	All	31 1/2	15 1/4	15 1/4	4 1/2	8 1/2	7	1 1/2	5/8	5/8	Yes	1 1/2 ELL	43 1/2	21 1/2	21 1/2	14	2 1/2	6	1 1/2	5/8	5/8	Yes	Franklin							
Gardner.....	1921-22	All	35	15 1/2	19 1/2	2 1/2	2 1/2	6	1 1/2	5/8	5/8	Yes	1 1/2 ELL	49 1/2	24 1/2	25	6	2 1/2	8	1 1/2	5/8	5/8	Yes	Gardner							
Gardner.....	1921-22	All	35	15 1/2	19 1/2	2 1/2	2 1/2	6	1 1/2	5/8	5/8	Yes	1 1/2 ELL	49 1/2	24 1/2	25	6	2 1/2	8	1 1/2	5/8	5/8	Yes	Gardner							
Grant.....	1920-21	All	38	17 1/2	20 1/2	1 1/2	1 1/2	7	2	5/8	5/8	Yes	1 1/2 ELL	50 1/2	26 1/2	26 1/2	20 1/2	2 1/2	9	2	1	5/8	Yes	Grant							
Halladay.....	1922	All	38	18	20	2 1/2	2 1/2	7	2 1/4	5/8	5/8	Yes	1 1/2 ELL	53 1/2	25 1/4	27 1/2	5 1/2	2 1/2	9	2 1/4	5/8	5/8	Yes	Halladay							
Handley Knight.....B	1922	All	38	18	20	2 1/2	2 1/2	7	2 1/4	5/8	5/8	Yes	1 1/2 ELL	53 1/2	25 1/4	27 1/2	5 1/2	2 1/2	9	2 1/4	5/8	5/8	Yes	B							
Hayfield.....A-42	1922	All	34	16 1/2	17 1/2	1 1/2	1 1/2	6	2 1/4	5/8	5/8	Yes	1 1/2 ELL	54	24 1/2	24 1/2	6	2 1/2	7	2 1/4	5/8	5/8	Yes	A-42							
Haynes.....55	1922	All	34	16 1/2	18	1 1/2	1 1/2	6	2 1/4	5/8	5/8	Yes	1 1/2 ELL	54	24 1/2	24 1/2	6	2 1/2	7	2 1/4	5/8	5/8	Yes	55							
Haynes.....75	1922	All	39	18	21	1 1/2	1 1/2	8	2 1/4	5/8	5/8	Yes	1 1/2 ELL	54	24 1/2	24 1/2	6	2 1/2	8	2 1/4	5/8	5/8	Yes	75							
Holmes.....Series 3, 4	1920-21-22	All	38	18	21	1 1/2	1 1/2	7	2 1/4	5/8	5/8	Yes	1 1/2 ELL	40	28 1/2	29 1/2	16	2 1/2	8	2 1/4	5/8	5/8	Yes	Series 3, 4							
Hudson.....	1920-21-22	All	38	18	20 1/2	1 1/2	1 1/2	7	2 1/4	5/8	5/8	Yes	1 1/2 ELL	40	28 1/2	29 1/2	16	2 1/2	8	2 1/4	5/8	5/8	Yes	Hudson							
Hupmobile.....R	1920-21-22	Tour.	36 1/2	16	20 1/2	4 1/2	2 1/2	7	2 1/4	5/8	5/8	Yes	1 1/2 ELL	51 1/2	24	24	5 1/2	2 1/2	8	2 1/4	5/8	5/8	Yes	R							
Hupmobile.....R	1920-21	Tour.	36 1/2	16	20 1/2	4 1/2	2 1/2	7	2 1/4	5/8	5/8	Yes	1 1/2 ELL	51 1/2	24	24	5 1/2	2 1/2	8	2 1/4	5/8	5/8	Yes	R							
Hupmobile.....R	1921	Sedan	37	16	21	4 1/2	2 1/2	8	2 1/4	5/8	5/8	Yes	1 1/2 ELL	51 1/2	24	24	5 1/2	2 1/2	8	2 1/4	5/8	5/8	Yes	R							
Hupmobile.....R	1922	Tour.	36 1/2	16	20 1/2	4 1/2	2 1/2	7	2 1/4	5/8	5/8	Yes	1 1/2 ELL	51 1/2	24	24	5 1/2	2 1/2	8	2 1/4	5/8	5/8	Yes	R							
Hupmobile.....R	1922	Sedan	37	16	21	4 1/2	2 1/2	8	2 1/4	5/8	5/8	Yes	1 1/2 ELL	51 1/2	24	24	5 1/2	2 1/2	8	2 1/4	5/8	5/8	Yes	R							
Jordan.....MX	1922	All	36 1/2	16 1/4	20 1/2	1 1/2	1 1/2	6	2	5/8	5/8	Yes	1 1/2 ELL	53 1/2	27	28 1/2	7 1/2	2 1/2	8	2	5/8	5/8	Yes	MX							
King.....8	1922	All	40	18	22	3 1/2	2 1/2	8	2	5/8	5/8	Yes	1 1/2 ELL	54	27 1/2	28 1/2	7 1/2	2 1/2	10	2 1/4	5/8	5/8	Yes	8							
Kissel.....	1922	All	38	18	20 1/2	3 1/2	2 1/2	8	2	5/8	5/8	Yes	1 1/2 ELL	54	27	27	3 1/2	2 1/2	9	2	5/8	5/8	Yes								
Kline.....6-55	1920-21-22	All	36 1/2	15 1/2	20 1/2	3 1/2	2 1/2	8	2	5/8	5/8	Yes	1 1/2 ELL	54	27	27	3 1/2	2 1/2	9	2	5/8	5/8	Yes	6-55							
Lafayette.....134	1920-21-22	All	42	19	23	1	1	9	2 1/4	5/8	5/8	Yes	1 1/2 ELL	60	30	30	1 1/4	2 1/2	10	2 1/4	5/8	5/8	Yes	134							
Lafayette.....134	1920-21-22	All	42	19	23	1	1	9	2 1/4	5/8	5/8	Yes	1 1/2 ELL	60	30	30	1 1/4	2 1/2	10	2 1/4	5/8	5/8	Yes	134							
Leach.....999	1921-22	All	41	18 1/2	22 1/2	1	1	9	2 1/4	5/8	5/8	Yes	1 1/2 ELL	56	28	28	3	3 1/2	11	2 1/4	5/8	5/8	Yes	999							
Lexington.....T-22	1922	All	34	16	18	1 1/2	1 1/2	7	2	5/8	5/8	Yes	1 1/2 ELL	50	25	25	0	4	10	2	5/8	5/8	Yes	T-22							
Locomobile.....48	1921-22	All	40	21	19	1 1/2	1 1/2	9	2	5/8	5/8	Yes	1 1/2 ELL	50	25	25	0	4	7	2 1/4	5/8	5/8	Yes	48							
Mabohm.....B	1922	All	35 1/2	15 1/2	20 1/2	3 1/2	2 1/2	7	1 1/2	5/8	5/8	Yes	1 1/2 ELL	50 1/2	23 1/2	23 1/2	6 1/2	2 1/2	12	2 1/4	5/8	5/8	Yes	B							
Marmont.....34	1922	All	38 1/2	18	20 1/2	3 1/2	2 1/2	12	2	5/8	5/8	Yes	1 1/2 ELL	45	22 1/2	22 1/2	3 1/4	2 1/2	13	2 1/4	5/8	5/8	Yes	34							
Mercer.....	1920-21-22	All	38 1/2	18	20 1/2																										

*—Dimensions given under load. †—All models except sedan, 2—All models except 7-passenger touring, sedan and limousine, Tour.—Touring, To & Se.—Touring and Sedan, To & Co.—Touring and Sedan 1½ Ell.—One Quarter Elliptic, ½ Ell.—One-half Elliptic. F. Ell.—Full Elliptic. T. Ell.—Transverse Cross Elliptic. Cant.—Cantilever. Plat.—Platform.

MAKE AND MODEL	Year	Body Style	FRONT SPRINGS							REAR SPRINGS							MAKE AND MODEL					
			Dimensions (Inches)					Leaves	Shackle Bolts		Dimensions (Inches)					Leaves		Shackle Bolt				
			A	B	C	D	E		No.	Width (Ins.)	Diam.	Are Eyes Bushed?	A	B	C			D	E	No.	Width (Ins.)	Diam.	Are Eyes Bushed?
34-C Oakland.....	1920-21-22	All§	36	15½	20½	20½	1½	7	1½	¾	Yes	½ Ell.	51	23	28	28	2½	8	1½	¾	Yes	34-C Oakland.....
34-C Oakland.....	1921-22	All	36	15½	20½	20½	1½	7	1½	¾	Yes	½ Ell.	51	23	28	28	2½	8	1½	¾	Yes	34-C Oakland.....
46, 45 Ogren.....	1921-22	All	37½	17½	20½	20½	1½	7	1½	¾	Yes	½ Ell.	57½	26	30½	30½	2½	9	2½	¾	Yes	46, 45 Ogren.....
46, 45 Oldsmobile.....	1922	All	38	17½	20½	20½	1½	8	2	¾	Yes	½ Ell.	54	25	30	30	2½	10	2½	¾	Yes	46, 45 Oldsmobile.....
47, 43A Oldsmobile.....	1921-23	All§	36	17	19	19	3½	8	2	¾	Yes	½ Ell.	54	25	30	30	2½	9	2½	¾	Yes	47, 43A Oldsmobile.....
47, 43A Overland.....	1921-22	All§	36	17	19	19	3½	8	2	¾	Yes	½ Ell.	54	25	30	30	2½	9	2½	¾	Yes	47, 43A Overland.....
116 Packard.....	1921-22	Tour.	38*	18	20	20	2½	9	2	¾	Yes	½ Ell.	54*	25½	30½	30½	2½	8	2½	¾	Yes	116 Packard.....
116 Packard.....	1922	Sedan	38*	18	20	20	2½	9	2	¾	Yes	½ Ell.	54*	25½	30½	30½	2½	8	2½	¾	Yes	116 Packard.....
335 Packard.....	1920-21-22	Tour.	41*	18	23	23	2½	8	2	¾	Yes	½ Ell.	60*	28	32	32	2½	8	3	¾	Yes	335 Packard.....
335 Packard.....	1921-22	Sedan	41*	18	23	23	2½	8	2	¾	Yes	½ Ell.	60*	28	32	32	2½	8	3	¾	Yes	335 Packard.....
6-66 Paige.....	1922	All	40	19	21	21	2½	11	2	¾	Yes	½ Ell.	61½	28	33½	33½	2½	12	2½	¾	Yes	6-66 Paige.....
6-66 Paige.....	1922	All	38	18	20	20	1½	10	2	¾	Yes	½ Ell.	61	28	33	33	2½	11	2½	¾	Yes	6-66 Paige.....
6-44 Paterson.....	1922	All	39	29	10	10	2½	12	2	¾	Yes	Plat.	48	22½	25½	25½	2½	10	2½	¾	Yes	6-44 Paterson.....
56 Peerless.....	1922	All	36	18	18	18	2½	10	1½	¾	Yes	Plat.	48	22½	25½	25½	2½	10	1½	¾	Yes	56 Peerless.....
Pierce Arrow.....	1920-21	All†	40	20	20	20	3½	8	2	¾	Yes	½ Ell.	60½	30½	30½	30½	2½	8	2½	¾	Yes	Pierce Arrow.....
Pierce Arrow.....	1920-21	To & Se	40	20	20	20	3½	8	2	¾	Yes	½ Ell.	60½	30½	30½	30½	2½	8	2½	¾	Yes	Pierce Arrow.....
Pierce Arrow.....	1922	All†	40	20	20	20	3½	16	2	¾	Yes	½ Ell.	61½	30½	31½	31½	2½	8	2½	¾	Yes	Pierce Arrow.....
Pierce Arrow.....	1922	To & Se	40	20	20	20	3½	16	2	¾	Yes	½ Ell.	61½	30½	31½	31½	2½	8	2½	¾	Yes	Pierce Arrow.....
6-50 Pilot.....	1921-22	All	39	18½	20½	20½	2½	9	2½	¾	Yes	½ Ell.	56½	27	29½	29½	2½	9	2½	¾	Yes	6-50 Pilot.....
6-50 Premier.....	1922	All	39	18½	20½	20½	2½	9	2½	¾	Yes	½ Ell.	57½	27	29½	29½	2½	13	2½	¾	Yes	6-50 Premier.....
R. & V. Knight.....R	1920-21	All	36	16½	19½	19½	2½	9	2	¾	Yes	½ Ell.	54½	29	25½	25½	2½	10	2½	¾	Yes	R. & V. Knight.....R
R. & V. Knight.....R	1922	All	37	16½	19½	19½	2½	9	2	¾	Yes	½ Ell.	57½	29	25½	25½	2½	10	2½	¾	Yes	R. & V. Knight.....R
R. & V. Knight.....J	1920-21	All	40	18	22	22	2½	9	2	¾	Yes	½ Ell.	56½	29	26½	26½	2½	9	2½	¾	Yes	R. & V. Knight.....J
R. & V. Knight.....J	1922	All	40	18	22	22	2½	9	2	¾	Yes	½ Ell.	56½	29	26½	26½	2½	9	2½	¾	Yes	R. & V. Knight.....J
T-6 Reo.....	1920-21-22	All	38	16½	21½	21½	2½	7	2	¾	Yes	½ Ell.	54	27	27	27	2½	10	2	¾	Yes	T-6 Reo.....
T-6 Reo.....	1922	All	38	16½	21½	21½	2½	7	2	¾	Yes	½ Ell.	54	27	27	27	2½	10	2	¾	Yes	T-6 Reo.....
C Rickenbacker.....	1920-21-22	All	36	17	19	19	1½	8	2½	¾	Yes	½ Ell.	58½	28½	30½	30½	2½	9	2½	¾	Yes	C Rickenbacker.....
C Rickenbacker.....	1922	All	36	17	19	19	1½	8	2½	¾	Yes	½ Ell.	58½	28½	30½	30½	2½	9	2½	¾	Yes	C Rickenbacker.....
6-54-E Roamer.....	1920-21-22	All§	39	18	21	21	3½	9	2	¾	Yes	Cant.	55½	29½	26½	26½	2½	8	2	¾	Yes	6-54-E Roamer.....
6-54-E Roamer.....	1920-21-22	All§	39	18	21	21	3½	9	2	¾	Yes	Cant.	55½	29½	26½	26½	2½	8	2	¾	Yes	6-54-E Roamer.....
6-54-E Roamer.....	1920-21-22	Sedan	39½	18	21½	21½	3½	9	2	¾	Yes	Cant.	55½	29½	26½	26½	2½	10	2	¾	Yes	6-54-E Roamer.....
6-54-E Roamer.....	1920-21-22	Sedan	39½	18	21½	21½	3½	9	2	¾	Yes	Cant.	55½	29½	26½	26½	2½	10	2	¾	Yes	6-54-E Roamer.....
4-75-E Rolls Royce.....	1922	All	42	21	21	21	0	12	2	¾	Yes	Cant.	54½	26½	26½	26½	2½	11	2½	¾	Yes	4-75-E Rolls Royce.....
Saxon.....	1921-22	All	30*	15	15	15	1½	6	2	¾	Yes	T. Ell.	40*	20	20	20	2½	7	2	¾	Yes	Saxon.....
Saxon.....	1922	All	30*	15	15	15	1½	6	2	¾	Yes	T. Ell.	40*	20	20	20	2½	7	2	¾	Yes	Saxon.....
CP Sayers.....	1920	All	38	18	20	20	3½	7	2	¾	No	½ Ell.	42½	21½	21½	21½	2½	8	2	¾	No	CP Sayers.....
CP Sayers.....	1921-22	All	38½	18½	20½	20½	3½	7	2	¾	No	½ Ell.	42½	21½	21½	21½	2½	8	2	¾	No	CP Sayers.....
DP Sayers.....	1920-21-22	All	36	17	19	19	1½	6	2	¾	No	Cant.	48½	27½	27½	27½	2½	9	2	¾	No	DP Sayers.....
DP Sayers.....	1921-22	All	36	17	19	19	1½	6	2	¾	No	Cant.	48½	27½	27½	27½	2½	9	2	¾	No	DP Sayers.....
L & O Seneca.....	1920-21-22	All	38	17	19	19	1½	6	2	¾	Yes	½ Ell.	54	27	27	27	2½	7	2	¾	Yes	L & O Seneca.....
L & O Seneca.....	1922	All	38	17	19	19	1½	6	2	¾	Yes	½ Ell.	54	27	27	27	2½	7	2	¾	Yes	L & O Seneca.....
50 & 51 Standard.....	1920-21	All	36	18	20	20	2½	8	2	¾	Yes	½ Ell.	51½	27½	27½	27½	2½	9	2½	¾	Yes	50 & 51 Standard.....
50 & 51 Standard.....	1922	All	38	18	20	20	2½	8	2	¾	Yes	½ Ell.	51½	27½	27½	27½	2½	9	2½	¾	Yes	50 & 51 Standard.....
Stanley Steamer.....	1920-21-22	All§	40½	19½	20½	20½	2½	7	2	¾	Yes	½ Ell.	51½	27½	27½	27½	2½	8	2	¾	Yes	Stanley Steamer.....
Stanley Steamer.....	1920-21-22	All	40½	19½	20½	20½	2½	7	2	¾	Yes	½ Ell.	51½	27½	27½	27½	2½	8	2	¾	Yes	Stanley Steamer.....
Stanwood.....	1920-21-22	All	38	18	20	20	2½	7	2	¾	Yes	½ Ell.	51	27	27	27	2½	8	2	¾	Yes	Stanwood.....
Stanwood.....	1922	All§	40	20	20	20	2½	7	2	¾	Yes	½ Ell.	57	26	31	31	2½	8	2	¾	Yes	Stanwood.....
Stearns Knight.....4	1920	All§	40	20	20	20	2½	7	2	¾	Yes	Cant.	50	30	27	27	2½	7	2	¾	Yes	Stearns Knight.....4
Stearns Knight.....4	1922	All§	40	20	20	20	2½	7	2	¾	Yes	Cant.	50	30	27	27	2½	7	2	¾	Yes	Stearns Knight.....4
80 Stearns Knight.....	1920-21-22	All	37½	18	19½	19½	2½	9	2	¾	Yes	½ Ell.	53½	24½	29½	29½	2½	8	2	¾	Yes	80 Stearns Knight.....
80 Stearns Knight.....	1922	All	37½	18	19½	19½	2½	9	2	¾	Yes	½ Ell.	53½	24½	29½	29½	2½	8	2	¾	Yes	80 Stearns Knight.....
90 Stephens.....	1921-22	All	37½	18	19½	19½	2½	9	2	¾	Yes	½ Ell.	53½	24½	29½	29½	2½	8	2	¾	Yes	90 Stephens.....
90 Stephens.....	1922	All	37½	18	19½	19½	2½	9	2	¾	Yes	½ Ell.	53½	24½	29½	29½	2½	8	2	¾	Yes	90 Stephens.....
H Stutz.....	1920	All	36½	16	20½	20½	1½	6	2	¾	Yes	½ Ell.	56	28	30	30	2½	5	2	¾	Yes	H Stutz.....
H Stutz.....	1921-22	All	36½	16	20½	20½	1½	6	2	¾	Yes	½ Ell.	56	28	30	30	2½	5	2	¾	Yes	H Stutz.....
K Stutz.....	1922	All	36½	16	20½	20½	1½	6	2	¾	Yes	½ Ell.	60	30	30	30	2½	5	2	¾	Yes	K Stutz.....
Templar.....	1920-21-22	All	36	17	19	19	2½	7	2	¾	Yes	½ Ell.	54	25	29	29	2½	8	2½	¾	Yes	Templar.....
Templar.....	1922	All	36	17	19	19	2½	7	2	¾	Yes	½ Ell.	54	25	29	29	2½	8	2½	¾	Yes	Templar.....
34 Valle.....	1921-22	All	35	16½	18½	18½	3½	.....	1½	¾	Yes	½ Ell.	54½	27½	26½	26½	2½	.....	2	¾	Yes	34 Valle.....
48 Valle.....	1920-21-22	All	37	17½	19½	19½	3½	.....	2	¾	Yes	½ Ell.	54½	27½	26½	26½	2½	.....	2><			

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Cleveland, O.	Used Car Show	June 16-24
Green Bay, Wis.	Annual Automobile Show	Aug. 27-30
Chicago	Commercial Vehicle Show	Sept. 1-7
Sacramento	Annual Automobile Show	Sept. 3-8
Indianapolis	Annual Fall Automobile and Accessory Show	Sept. 3-8
Memphis	Annual Automobile Show	Sept. 28-30
Fresno, Calif.	Automobile Show	Sept. 28-Oct. 5
Little Rock, Ark.	Annual Automobile Show	Oct. 8-13
Chicago	Chicago Closed Car Show, Coliseum	Oct. 13-20
Dallas, Texas	Annual Fall Show	Oct. 13-23
Washington, D. C.	Annual Fall Automobile Show	Oct. 28-31
Waco, Texas	Waco Automobile Dealers' Assn.	Oct. 29-Nov. 5
New York	Foreign Automotive Association Exposition	Nov. 4-10

RACES

Tours, France	Grand Prix 500 Mile Race	July 2
Kansas City, Mo.	Kansas City Speedway	July 4
Pikes Peak Hill Climb		Sept. 3
Italy	Monza Speedway, 500 miles	Sept. 9

CONVENTIONS

Spring Lake, N. J.	Summer Meeting of the Society of Automotive Engineers	June 19-23
Chicago	National Conference of Trade Association Secretaries and Managers under the auspices of the National Automobile Dealers' Assn.	July 23-24
Dixville Notch, N.H.	Summer Meeting of the Automotive Equipment Association	June 25-July 1
Olympia, Wash.	Convention Washington Automotive Trade Association	July
Mobile, Ala.	Semi-Annual Meeting of the Alabama Automotive Trades Association	July 23
Eric, Pa.	Annual Convention, Pennsylvania Automotive Association	Aug. 13-14
Chicago	Exhibit and Convention of Automotive Equipment Association	Nov. 12-17

SQUEEKS & RATTLES

Join the Club

Squeeks & Rattles Club

Our club is progressing very rapidly. It is time we had an election of officers. Nominate your choice from the list of names that have appeared on this page since its advent and send them to Squeeks & Rattles, care Motor Age, Mallers Bldg., Chicago. All you've got to do to be a member of Squeeks & Rattles Club is send us a gloom chaser that is printed on this page. We'll do the rest. C'mon, we want one hundred members at least for a start.

Left Him Haughtily

There were two men named Brown in a certain village. One lost his wife and the other a boat at the same time. The vicar's wife called, as she supposed, on the bereaved Mr. Brown.

"I am so sorry to hear of your great loss," she said sympathetically.

"Oh, it isn't much matter," was the reply, "she wasn't up to much."

"Indeed," said the surprised woman.

"Yes," continued Brown, "she was a rickety old thing. I offered her to my brother, but he wouldn't have her. I've had my eye on another for some time."

With that the outraged woman fled.—Clipped.

FABLE

Once there was a motorist who only took a battery test, and instead of driving out with a muttered thanks, said, "Here's a quarter, you can't afford to give such service free."—Steve.

What's a Ruff Road, More or Less?

A man named Bill, a friend of mine,
Called on his girl at half-past nine.
Now this man, Bill, was sure he knew,
Just what this girl would like to do.

"Oh, come with me, out to the lake,
That country road tonight we'll take."

"Well, if that's all, don't make a fuss,
There's snubbers on this darned old bus."

—Syracuse Stenog.

We are going to start the Ladies' Auxiliary to the Squeeks & Rattles Club and we nominate Syracuse Stenog. for president.

There are those who may doubt it, but Orough Bros. are not in the automotive repair business in Ft. Worth, Texas.—Kerosene Circuit.

Guy writes to Readers' Clearing House saying, "Please, I would like some legal advise in regard to aluminum pistons, from you as there is a lot of trouble with alloy pistons.

Have they been tampering with the laws of contraction and expansion again?

Favorite Agonies

One guy says his jane is so dumb that she thinks in order to cool the engine, you've got to strip the gears.

Maybe It's a Glide

By "Kay Em" Roberts

My auto 'tis of thee,
Sweet pile of grief to me,
Of thee I sing.
To drive you I have tried
And o'er you I have cried,
You've got me roped and tied—
You worthless thing!

When you were bright and new
I took a fall for you,
I had no brains,

You looked so smart and nice
I thought you worth the price—
You've almost broke me twice,
You give me pains!

I've tried to drive with you
Just for a mile or two—
It is no use.

You'd cough and wheeze and snort,
Not once were you a sport,
You'd make a loud report—
Then lose your juice.

I've labored all these years
With you, till I'm in tears,
To make you run.
But now I'm old and gray,
I've found you'll never pay—
I'm selling you for junk today—
Old top, I'm done!

Let's knock the L and everything else out of gloom!

"TAINT for sore feet."

Guy writing for horse paper says Indianapolis race is "commercialized" and "unsportmanlike."

All together, now, what kind of a paper does he write for?

He slams it onto the drivers, calling them men who do not "take the proper physical care of themselves" but where is the jockey who would hold his mount through 500 miles of hell at better than 80 per?

He would change his opinion as to their physical fitness were he to say that to their faces.

But we don't mind a drowning man grasping at a straw—he'll drown, anyway.

LEW BRICATION

Current Motor Truck Specifications

(This list comprises trucks distributed on a national basis)

MAKE AND MODEL	Tons Capacity	Price	ENGINE		Clutch Make	Gearset Make	REAR AXLE		TIRES	
			Make & Model	Bore & Stroke			Make & Model	Final Drive	Front	Rear
Ace.....30	1 1/2	\$2600	Mi-412	3 1/2x5	B-L	B-L	Ti-6560	WO.	34x3 1/2	34x5k
Ace.....40	2-2 1/2	3250	Mi-402	4 1/2x5 1/2	B-L	B-L	Ti-6460	WO.	36x4k	36x7k
Ace.....60	3	3800	Mi-402	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO.	36x4	36x8
Acme.....30	1 1/2	2400	Co-N	3 1/2x5	B&B	Cot.	Ti-6250	WO.	34x5n	34x5n
Acme.....40	2-1 1/2	2800	Co-N	3 1/2x5	B&B	Cot.	Ti-6352	WO.	34x3 1/2	34x5
Acme.....60	3	3200	Co-J1	4 1/2x5 1/2	B&B	Cot.	Ti-6460	WO.	34x3 1/2	34x5
Acme.....80	4	3800	Co-L1	4 1/2x5 1/2	B&B	Cot.	Ti-6560	WO.	36x4	36x7
Acme.....125	5-6 1/2	4950	Co-B5	4 1/2x6	B&B	Cot.	Ti-6760	WO.	36x6	40x12
Amer. La France	3 1/2	5500	Own.	4 1/2x6	Own.	Own.	Own.	WO.	36x5	36x5
Armleder.....20	1 1/2	1400	Bu-CTU	3 1/2x5 1/2	Ful.	Ful.	Ti-6460	WO.	34x3 1/2	34x5k
Armleder.....HWC	2 1/2	1800	Bu-HTU	4 1/2x5 1/2	Ful.	Ful.	Ti-6560	WO.	36x4k	36x7dk
Armleder.....HWC	3 1/2	2200	Co-C4	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO.	36x4k	36x7dk
Armleder.....KWC	3 1/2	2200	Bu-YTU	4 1/2x6	B-L	B-L	Ti-6666	WO.	36x5k	36x5dk
Atlas.....25	1 1/2	1495	Co-R1	3 1/2x5 1/2	B&B	Own.	Own.	WO.	34x4 1/2	34x4 1/2
Atterbury.....20R	1 1/2	2175	Co-J4	3 1/2x5	B-L	B-L	Ti-6460	WO.	36x4n	36x6n
Atterbury.....22C	2-3	2375	Co-K4	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO.	36x4k	36x4d
Atterbury.....22D	2-3	2475	Co-L4	4 1/2x5 1/2	B-L	B-L	Ti-6660	WO.	36x5	40x6
Atterbury.....8E	5-6	4975	Co-B2	4 1/2x6	B-L	B-L	Ti-6760	WO.	36x6	40x7
Autocar.....21	1 1/2	2200	Own.	4 1/2x5 1/2	Own.	Own.	Own.	DR.	34x4	34x6
Autocar.....27	2-3	3100	Own.	4 1/2x6	Own.	Own.	Own.	DR.	34x5	36x8
Autocar.....26	1-6	4200	Own.	4 1/2x6 1/2	Own.	Own.	Own.	DR.	34x6	36x12
Available.....JH	1 1/2	2150	He-O	4x5	B-L	B-L	Ti-6460	WO.	36x3 1/2	36x5
Available.....HJ	2 1/2	3160	He-CU3	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO.	36x4	36x8
Available.....HJ	3 1/2	4175	He-MU3	4 1/2x5 1/2	B-L	B-L	Ti-6666	WO.	36x5	40x5d
Available.....HJ	5	5375	He-T3	5x6	B-L	B-L	Ti-6760	WO.	36x6	40x12
Avery.....1-1 1/2	1-1 1/2	1450	Own.	3x4	Own.	Own.	To-OX2	IG.	34x5n	34x5n
Bessemer.....G	1	1905	Co-N	3 1/2x5	Ful.	Ful.	To-A	IG.	35x5n	35x5n
Bessemer.....H2	1 1/2	2895	Co-N	3 1/2x5	B&B	Bak.	LM-7150	DR.	36x3 1/2	36x5
Bessemer.....J2	2 1/2	3495	Co-C2	4 1/2x5 1/2	B&B	B-L	LM-7250	DR.	36x4	36x4d
Bethlehem.....KN	1-1 1/2	1385	Own.	3 1/2x5 1/2	B&B	B-L	To-E	IG.	36x5	36x10
Bethlehem.....GN	2-2 1/2	2185	Own.	3 1/2x5	B&B	Det.	Ea-3070	SB.	35x5n	35x5n
Bethlehem.....HN	3-3 1/2	2985	Own.	4x5 1/2	B&B	Det.	Wi-60A	DR.	34x4	34x6
Brookway.....E2	1	1450	Wi-SU	4x5	B-L	B-L	Co-5200	SB.	33x5n	33x5n
Brookway.....S	1 1/2	1800	Wi-SU	4x5	B-L	B-L	Ti-6460	WO.	36x4	36x6
Brookway.....K	2 1/2	2400	Co-K4	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO.	36x4	36x8
Brookway.....R	3 1/2	3000	Co-L4	4 1/2x5 1/2	B-L	B-L	Ti-6666	WO.	36x5	36x5d
Case.....23-4-SD	3 1/2	945	Co-B5	4 1/2x6	B-L	B-L	Ti-6760	WO.	36x6	40x7d
Case.....TR	3 1/2	975	Own.	4 1/2x5 1/2	Own.	Own.	Own.	SB.	31x4n	31x4n
Chevrolet.....Sup	1	1450	Own.	3 1/2x5	TD	Own.	To-C139	IG.	36x6n	36x7n
Clydesdale.....10	1 1/2	1850	Co-N	3 1/2x5	B&B	B-L	Ti-5511	SB.	34x5n	34x5n
Clydesdale.....8	1 1/2	1850	Co-K4	4 1/2x5 1/2	B-L	B-L	Ti-6460	WO.	36x4	36x7
Clydesdale.....6	1 1/2	1850	Co-L4	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO.	36x5	36x5d
Clydesdale.....4	1 1/2	1850	Co-B5	4 1/2x6	B-L	B-L	Ti-6660	WO.	36x6	40x6d
Commerce.....14-1 1/2	14-1 1/2	1850	Co-B5	4 1/2x6	B-L	B-L	Ti-6760	WO.	36x7	40x7d
Commerce.....14	1 1/2	1850	Co-N	3 1/2x5	Det.	Det.	Sa-D16	SB.	32x4 1/2	32x4 1/2
Commerce.....25	2 1/2	2400	Co-J4	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO.	36x3 1/2	36x5k
Corbett.....E1	1 1/2	1250	HS-700	3 1/2x5	B-L	B-L	Sh-100	WO.	34x4 1/2	34x4 1/2
Corbett.....D1	1 1/2	1480	Co-N	3 1/2x5	B-L	B-L	Sh-100	WO.	34x3 1/2	34x4k
Corbett.....C2	2	2200	Co-K4	4 1/2x5 1/2	B-L	B-L	Sh-150	WO.	34x3 1/2	34x5k
Corbett.....R3	2 1/2	3000	Co-L4	4 1/2x5 1/2	B-L	B-L	Sh-103	WO.	36x3 1/2	36x7k
Corbett.....A3-4	3-4	3900	Co-L4	4 1/2x5 1/2	B-L	B-L	Sh-21	WO.	36x4k	36x8
Corbett.....AA5	5	4600	Co-B5	4 1/2x6	B-L	B-L	Sh-32	WO.	36x5	36x10
Day-Elder.....AN	1 1/2	1800	Bu-WTU	3 1/2x5 1/2	B-L	B-L	Ti-6352	WO.	34x3 1/2	34x4
Day-Elder.....BN2	2 1/2	2400	Co-J4	4 1/2x5 1/2	B-L	B-L	Ti-6460	WO.	34x3 1/2	34x5
Day-Elder.....DN2	2 1/2	2400	Co-K4	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO.	36x4	36x7
Day-Elder.....CN3	3 1/2	3000	Bu-HTU	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO.	36x4	36x8
Day-Elder.....FN4	4	3600	Co-L4	4 1/2x5 1/2	B-L	B-L	Ti-6666	WO.	36x5	36x5d
Day-Elder.....EN5-6	5-6	4200	Bu-YTU	4 1/2x6	B-L	B-L	Ti-6760	WO.	36x5	36x5d
Dearborn.....E1	1	1600	Bu-MU	3 1/2x5	Ful.	Ful.	Wi	WO.	35x5n	35x5n
Dearborn.....F1 1/2	1 1/2	1980	Bu-WU	3 1/2x5 1/2	Ful.	Ful.	Wi	WO.	34x4	34x5
Dearborn.....48	2	2390	Bu-WU	3 1/2x5 1/2	Ful.	Ful.	Wi	WO.	34x4	34x5
Defiance.....G1	1 1/2	1525	Co-N	3 1/2x5	B&B	G-L	Ea-1000	SB.	35x5n	35x5n
Denby.....31-1 1/2	31-1 1/2	1185	Co-N	3 1/2x5	Ful.	Ful.	Cl-B300	SB.	34x5n	34x5n
Denby.....332	332	2375	Co-J4	4 1/2x5 1/2	B-L	B-L	Cl-D	IG.	35x5n	35x7n
Denby.....214	214	2945	Co-B5	4 1/2x6	B-L	B-L	Cl-D	IG.	36x5	40x11
Denby.....353	353	2975	Co-K4	4 1/2x5 1/2	B-L	B-L	Cl-D	IG.	36x5	36x5d
Denby.....274	274	3805	Co-L4	4 1/2x5 1/2	B-L	B-L	Cl-D	IG.	36x6	40x6d
Denby.....2105	2105	4295	Co-B5	4 1/2x6	B-L	B-L	Cl-D	IG.	36x6	40x6d
Dependable.....CD	1 1/2	2150	Bu-CTU	3 1/2x5 1/2	Ful.	Ful.	Wi-800J	WO.	34x5	36x8
Dependable.....EG	2-3	2950	Bu-CTU	3 1/2x5 1/2	Ful.	Ful.	Wi-900C	WO.	36x5	36x10
Diamond T.....03	1-1 1/2	1850	Hi-700	3 1/2x5 1/2	Cov.	Cov.	Own.	WO.	36x3 1/2	36x4
Diamond T.....T1	1 1/2	1850	Hi-700	3 1/2x5 1/2	Cov.	Cov.	Own.	WO.	36x3 1/2	36x5
Diamond T.....U2	2 1/2	2100	Hi-1400	4 1/2x5 1/2	Cov.	Cov.	Own.	WO.	36x4k	36x8k
Diamond T.....K3 1/2	3 1/2	2400	Hi-1500	4 1/2x5 1/2	Cov.	Cov.	Own.	WO.	36x5	36x5d
Diamond T.....EL5	5	4200	Hi-200	4 1/2x6	Cov.	Cov.	Own.	WO.	36x6	40x6d
Diamond T.....S5	5	4200	Co-B5	4 1/2x6	B-L	B-L	Ti-6760	WO.	36x6	40x6d
Dodge Brothers.....34	34	750	Own.	3 1/2x5 1/2	Own.	Own.	Own.	SB.	32x4n	32x4n
Dorris.....K-4	2 1/2	3400	Own.	4 1/2x5 1/2	Own.	Own.	Own.	SB.	32x4n	32x4n
Dorris.....K-4	2 1/2	4400	Own.	4 1/2x5 1/2	Own.	Own.	Own.	SB.	32x4n	32x4n
Dart.....109 1/2	109 1/2	685b	Ly-K	3 1/2x5	Det.	Own.	Fl-105	SB.	31x4n	31x4n
Double Dr.....DFT3	3	4000	Bu-ETU	3 1/2x5 1/2	B&B	Own.	Own.	WO.	36x6	36x8
Duplex.....G1	1	1450	Bu-WTU	3 1/2x5 1/2	B-L	B-L	Ti-5511	SB.	33x5	33x5n

*—Make Optional
†—Short wheelbase model
‡—6 cylinders
§—All 4 cyl. engines unless otherwise specified
||—Truck Tractor
**—Front wheel drive
b—price includes body or cab
d—dual
k—pneumatic tires optional at extra cost
n—pneumatic tires standard

ENGINE:

Bu—Buda
Co—Continental
Do—Dodge
He—Hercules
Hi—Hinkley
HS—Herschell-Spillman
Ly—Lycoming
MI—Midwest
Wa—Waukesha
We—Weledey
Wi—Wisconsin

CLUTCH & GEARSET

B&B—Borg & Beck
B-L—Brown-Lipe
Bak—Baker
Cam—Campbell
Cot—Cotta
Cov—Covert
Del—Detlaiff
Det—Detroit
Ful—Fuller
H-S—Hele-Shaw
Hoo—Hooser
M&E—Merchant & Evans

Mec—Mechanics

Mun—Muncie
T. D.—Twin Disc
War—Warner

REAR AXLE:

Am—American
Cl—Clark
Co—Columbia
Du—Durstion
Ea—Eaton
Fl—Flint
LM—L-M

Ru—Russel

Sa—Salisbury
Sh—Sheldon
Ti—Timken
To—Torbenen
Wa—Walker
Wi—Wisconsin
Ch—Chain
DR—Double Reduction
IG—Internal Gear
SB—Spiral Bevel
SP—Straight Bevel
WO—Worm

Current Motor Truck Specifications—Continued

(This list comprises trucks distributed on a national basis)

MAKE AND MODEL			Tons Capacity	ENGINE				REAR AXLE		TIRES	
Make & Model	Price	Bore & Stroke		Clutch Make	Gearset Make	Make & Model	Final Drive	Front	Rear		
Larrabee...X2	1-1 1/2	\$1865	Co-8R...	3 1/2 x 4 1/2	B-L.	B-L.	Sa-1480	SB...	34x5n	34x5n	
Larrabee...J4	1 1/2-2 1/2	2400	Co-J4...	3 1/2 x 5	B-L.	B-L.	Sh-1501	WO...	34x3 1/2	34x5k	
Larrabee...K5	2 1/2-3 1/2	3400	Co-L4...	4 1/2 x 5 1/2	B-L.	B-L.	Sh-22...	WO...	36x8	36x8	
Larrabee...L4	3 1/2-4 1/2	4000	Co-L4...	4 1/2 x 5 1/2	B-L.	B-L.	Sh-31...	WO...	36x5	36x10	
Maccar...L2	1 1/2		Co-K4...	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6460	WO...	36x4	36x6	
Maccar...HA	2		Co-K4...	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6560	WO...	36x4	36x4d	
Maccar...H3	3		Co-L4...	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6560	WO...	36x4	36x5d	
Maccar...M3	4		Co-L4...	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6666	WO...	36x5	36x6d	
Maccar...G5-6			Co-B2...	4 1/2 x 6	B-L.	B-L.	Ti-6760	WO...	36x6	40x6d	
MacDonald...O3-5		5500b	Bu-WTU	3 1/2 x 5 1/2	B-L.	B-L.	**Own.	IG...	36x6	36x10	
MacDonald...A7		8000b	Bu-YTU	4 1/2 x 6	B-L.	B-L.	**Own.	IG...	40x7	40x14	
Mack...AB	1 1/2	3000	Own.	4x5	Own.	Own.	Own.	Ch...	36x4	36x3 1/2	
Mack...AB	1 1/2	3450	Own.	4x5	Own.	Own.	Own.	Ch...	36x4	36x4d	
Mack...AB	2	3300	Own.	4 1/2 x 5	Own.	Own.	Own.	Ch...	36x4	36x4d	
Mack...AB	2	3750	Own.	4 1/2 x 5	Own.	Own.	Own.	Ch...	36x4	36x4d	
Mack...AB	2 1/2	3400	Own.	4 1/2 x 5	Own.	Own.	Own.	Ch...	36x4	36x4d	
Mack...AB	2 1/2	3850	Own.	4 1/2 x 5	Own.	Own.	Own.	Ch...	36x5	40x5d	
Mack...AC	3 1/2	4950	Own.	5x6	Own.	Own.	Own.	Ch...	36x6	40x6d	
Mack...AC	3 1/2	5500	Own.	5x6	Own.	Own.	Own.	Ch...	36x6	40x12	
Mack...AC	3 1/2	5750	Own.	5x6	Own.	Own.	Own.	Ch...	36x7	40x7d	
Mack...AC	3 1/2	6000	Own.	5x6	Own.	Own.	Own.	Ch...	36x7	40x7d	
Mack...AB	5	3400	Own.	4 1/2 x 5	Own.	Own.	Own.	Ch...	36x5	40x5d	
Mack...AC	7	4950	Own.	5x6	Own.	Own.	Own.	Ch...	36x6	40x6d	
Mack...AC	10	5500	Own.	5x6	Own.	Own.	Own.	Ch...	36x6	40x12	
Mack...AC	13	5750	Own.	5x6	Own.	Own.	Own.	Ch...	36x7	40x7d	
Mack...AC	15	6000	Own.	5x6	Own.	Own.	Own.	Ch...	36x7	40x7d	
Mason...H	1 1/2	1200	He...	4x5	Own.	War.	FL...	SB...	34x5n	34x5n	
Master...JW	1 1/2	2290	Bu-OU...	4 1/2 x 5 1/2	Ful.	Ful.	Ti-6460	WO...	34x4	34x5	
Master...DD	1 1/2	3190	Bu-HU...	4 1/2 x 5 1/2	Ful.	Ful.	Wa-25A	IG...	34x4	36x8	
Master...W	2 1/2	2790	Bu-HU...	4 1/2 x 5 1/2	Ful.	Ful.	Ti-6560	WO...	34x4	36x8	
Master...A	3 1/2	3990	Bu-YTU	4 1/2 x 6	B-L.	B-L.	Ti-6666	WO...	36x5	40x5d	
Master...B	5	4990	Bu-ATU	4 1/2 x 6 1/2	B-L.	B-L.	Ti-6760	WO...	36x6	40x6d	
Master...F5		5090	Bu-ATU	4 1/2 x 6 1/2	B-L.	B-L.	Wa-5A	IG...	36x6	40x6d	
Maxwell...H	1 1/2	932	Own.	3 1/2 x 4 1/2	Own.	Own.	Ti...	WO...	35x5n	35x5n	
Menominee...B	1 1/2	1650	Wi-SU...	4x5	B&B.	Det.	Co-5200	SB...	35x5n	35x5n	
Menominee...HT	1 1/2	2000	Wi-FAU	3 1/2 x 5	Ful.	Det.	Wi-800G	WO...	34x3 1/2	36x5k	
Menominee...H	1 1/2	2175	Wi-FAU	4x5	Ful.	Det.	Wi-800H	WO...	36x3 1/2	36x5k	
Menominee...D	2-2 1/2	2875	Wi-TAU	4 1/2 x 6	Ful.	Det.	Wi-800J	WO...	36x4	36x8	
Menominee...J	5	4850	Wi-RAU	4 1/2 x 6	B&B.	Det.	Ti-6760	WO...	36x6	40x12	
Moline...10	1 1/2	1695	Own.	3 1/2 x 5	B&B.	Own.	To-A...	IG...	34x5n	36x6n	
Moreland...R.R.	1 1/2	1595	He-O...	4x5	B-L.	B-L.	Ti-5512	WO...	34x5n	34x5n	
Moreland...BX	1 1/2	1980	He-O...	4x5	B-L.	B-L.	Ti-6461	WO...	36x4	36x8	
Moreland...EX	2	2625	Co-K4...	4 1/2 x 5 1/2	Own.	Own.	Ti-6461	WO...	36x4	36x8	
Moreland...AX	3 1/2	3500	Co-L4...	4 1/2 x 5 1/2	Own.	Own.	Ti-6560	WO...	36x5	36x10	
Moreland...RX	5	4600	Co-B5...	4 1/2 x 6	Own.	Own.	Ti-6666	WO...	36x6	40x12	
Nash...2018	1-1 1/2	1595	Own.	3 1/2 x 5 1/2	B&B.	Det.	Cl-ID.	IG...	34x4	34x5	
Nash...4017F	2-2 1/2	2750	Bu-HU...	4 1/2 x 5 1/2	B&B.	Own.	Own.	IG...	36x6	36x6	
Nash...3018	2-2 1/2	2150	Own.	3 1/2 x 5 1/2	B&B.	Det.	Cl-ID.	IG...	34x4	34x7	
Nash...5018	2 1/2	2250	Own.	3 1/2 x 5 1/2	B&B.	Det.	Cl-ID.	IG...	34x4	34x7	
Noble...A-21	1-1 1/2	1750	Bu-MU...	3 1/2 x 5 1/2	Ful.	Ful.	Sh-1501	WO...	34x5n	34x5n	
Noble...B-31	1 1/2-2	2395	Bu-CTU	3 1/2 x 5 1/2	Ful.	Ful.	Sh-103	WO...	36x4	36x7	
Noble...D-51	2 1/2-3 1/2	2795	Bu-HTU	4 1/2 x 5 1/2	Ful.	Ful.	Sh-21	WO...	36x5	36x10	
Noble...E-71	3 1/2-5	3495	Bu-YTU	4 1/2 x 6	Ful.	War.	Sh-30	WO...	36x5	36x10	
Old Reliable...B	2 1/2	3500	Wi-UAU	4 1/2 x 6	Ful.	Ful.	Sh-21	WO...	34x4	36x8	
Old Reliable...C	2 1/2	4250	Wi-UAU	4 1/2 x 6	Ful.	Ful.	Sh-31	WO...	36x5	36x12	
Old Reliable...D5	5	5000	Wi-RAU	4 1/2 x 6	Own.	B-L.	Sh...	Ch...	36x6	40x14	
Old Reliable...K7	7 1/2	6000	Wa-P...	4 1/2 x 6 1/2	Own.	Own.	Own.	Ch...	36x6	35x5n	
Oldsmobile...T	1	1095	Own.	3 1/2 x 5 1/2	B&B.	War.	To-OX2	IG...	35x5n	35x5n	
Oneida...C	1 1/2-2	2825	Hi-400	4x5 1/2	Ful.	Ful.	Wi-800J	WO...	36x3 1/2	36x7	
Oneida...C2	2 1/2	3200	Hi-400	4x5 1/2	Ful.	Ful.	Wi-900C	WO...	36x4	36x7	
Oneida...D3	3 1/2	4050	Hi-200	4 1/2 x 5 1/2	Ful.	Ful.	Ti-6652	WO...	36x5	36x10	
Overland...AD	1 1/2	425	Own.	3 1/2 x 4	B&B.	Own.	Own.	SB...	30x3 1/2	30x3 1/2	
Packard...EC	2-3	3100	Own.	4 1/2 x 5 1/2	Own.	Own.	Own.	WO...	36x4	36x7	
Packard...EX	2 1/2	3500	Own.	4 1/2 x 5 1/2	Own.	Own.	Own.	WO...	36x6n	40x8n	
Packard...ED	3-5	4100	Own.	4 1/2 x 5 1/2	Own.	Own.	Own.	WO...	36x5	36x5d	
Packard...EF	5-7	4500	Own.	5x5 1/2	Own.	Own.	Own.	WO...	36x6	40x6d	
Patriot, Revere...1		1295	Co-N...	3 1/2 x 5	B&B.	Cov.	Du-B	WO...	35x5n	35x5n	
Patriot, Lincoln...2		2400	Hi-100	4x5 1/2	Cov.	Ful.	Ti-6560	WO...	34x4n	34x4n	
Pat, Washington...3		3000	Hi-200	4 1/2 x 5 1/2	Cov.	Cov.	Wi-900	WO...	36x5n	36x8n	
Pierce Arrow...X5		3200b	Own.	4x5 1/2	Own.	Own.	Own.	WO...	36x4	36x4d	
Pierce Arrow...W2	3 1/2	4350b	Own.	4 1/2 x 6 1/2	Own.	Own.	Own.	WO...	36x5	36x5d	
Pierce Arrow...R10	5	4850b	Own.	4 1/2 x 6 1/2	Own.	Own.	Own.	WO...	36x5	40x6d	
Rainier...R31	3/4		Co-N...	3 1/2 x 5	B-L.	B-L.	Ti-6250	WO...	35x5n	35x5n	
Rainier...R29	1		Co-N...	3 1/2 x 5	B-L.	B-L.	Ti-6250	WO...	34x3 1/2	34x4	
Rainier...R36	1 1/2		Co-J...	3 1/2 x 5	B-L.	B-L.	Ti-6460	WO...	34x3 1/2	34x7	
Rainier...R28	2-2 1/2		Co-K4...	4 1/2 x 5 1/2	B-L.	B-L.	Sh-103	WO...	36x4	36x8	
Rainier...R20	2 1/2-3		Co-K4...	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6560	WO...	36x4	36x8	
Rainier...R25	3 1/2-5		Co-L4...	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6666	WO...	36x5	36x5d	
Rainier...R27	6		Co-B5...	4 1/2 x 6	B-L.	B-L.	Ti-6760	WO...	36x6	40x6d	
Reo...F	1 1/2	1185	Own.	4 1/2 x 4 1/2	Own.	Own.	Own.	SB...	34x4 1/2	34x4 1/2	
Republic...75	3/4	1395b	Ly-KB...	3 1/2 x 5	Ful.	Ful.	To-750	IG...	33x5n	33x5n	
Republic...10E	1	1395	Co-N...	3 1/2 x 5	Ful.	Ful.	To-1000	IG...	34x5n	34x5n	
Republic...11X	1 1/2	1795	Co-J4...	3 1/2 x 5	Ful.	Ful.	To-CT2	IG...	34x3 1/2	34x6	
Republic...19W	2 1/2		Wa-FU...	4x5 1/2	Ful.	Ful.	To-CT2	IG...	36x4	36x7	
Republic...19	2 1/2	2195	Co-K4...	4 1/2 x 5 1/2	Ful.	Ful.	To-CT2	IG...	36x4	36x7	
Republic...20	3 1/2	3095	Co-L4...	4 1/2 x 5 1/2	Ful.	Ful.	To-E...	IG...	36x5	36x5d	
Rowe...CW	1 1/2	3090	Wi-CAU	3 1/2 x 5	B-L.	B-L.	Sh-1501	WO...	36x6n	36x3 1/2	
Rowe...CDW	2 1/2	3300	Wi-EAU	4x5	B-L.	B-L.	Sh-103	WO...	34x5	36x4d	
Rowe...CDW	2 1/2		Wi-NU...	4 1/2 x 5	B-L.	B-L.	Sh-21	WO...	34x5	36x5d	
Rowe...GSW	3	4150	Wi-TAU	4x6	B-L.	B-L.	Sh-21	WO...	36x7	36x6d	
Rowe...HW	1	4500	Wi-UAU	4 1/2 x 6	B-L.	B-L.	Sh-31	WO...	36x7	40x6d	
Rowe...FW	5	4850	Wi-UAU	4 1/2 x 6	B-L.	B-L.	Sh-51	WO...	36x7	40x6d	
Ruggles...15	3/4	795	HS...	3 1/2 x 5				SB...	32x4 1/2	32x4 1/2	
Ruggles...20R	1 1/2	1295	Own.	4x5	B-L.	B-L.	Co-5200	SB...	34x5n	34x5n	
Ruggles...40	2	1995	Own.	4x5	B-L.	B-L.	Wi-65	DR...	34x5n	34x7	
Ruggles...40H	2 1/2	2195	Own.	4x5	B-L.	B-L.	Wi-65	DR...	34x5n	34x7	
Sandow...CG&G	1	\$1795	Co-N...	3 1/2 x 5	Ful.	Ful.	Sh-1501	WO...	34x3 1/2	34x5	
Sandow...J	2 1/2	2750	Co-C4...	4 1/2 x 6 1/2	B-L.	B-L.	Ti-6560	WO...	36x4	36x7	
Sandow...M	5	\$4325	Co-B5...	4 1/2 x 6	B-L.	B-L.	Ti-6760	WO...	36x6	40x12	
Sanford...10	1 1/2-2 1/2	1795	Co-8R...	3 1/2 x 4 1/2	B&B.	B-L.	Sa-D	SB...	3		

Current Motor Truck Specifications—Continued

(This list comprises trucks distributed on a national basis)

MAKE AND MODEL	Tons Capacity	Price	ENGINE		Clutch Make	Gearset Make	REAR AXLE		TIRES	
			Make & Model	Bore & Stroke			Make & Model	Final Drive	Front	Rear
Walter.....N2	36000	Own.....	4x5 1/2	B-L.	B-L.	Own.....	DR.	36x4	36x8	
Walter.....S5	51000	Own.....	4x5 1/2	B-L.	War.	Own.....	DR.	36x8	40x8d	
White.....15 3/4	2400	Own.....	3 3/4 x 5 1/2	Own.	Own.	Own.....	SP.	34x5n	34x5n	
White.....20 1/2	3250	Own.....	3 3/4 x 5 1/2	Own.	Own.	Own.....	DR.	36x4	36x7d	
White.....40 3/4	4200	Own.....	4 1/2 x 5 1/2	Own.	Own.	Own.....	DR.	36x5	40x5d	
White.....45 1/2	4500	Own.....	4 1/2 x 5 1/2	Own.	Own.	Own.....	DR.	36x6	40x6d	
Wilcox.....AA1	1900	Bu-CTU	3 3/4 x 5 1/2	B-L.	B-L.	Ru-3600	SP.	35x5	35x5	
Wilcox.....BB1 1/2	2550	Own.....	4 1/2 x 5	B&B.	Own.	Wa-2A.	DR.	36x6k	38x7k	
Wilcox.....CC2 1/2	3350	Own.....	4 1/2 x 5	B&B.	Own.	Wa-25A.	DR.	36x6k	40x8k	
Wilcox.....EE3 1/2	3350	Bu-YTU	4 1/2 x 6	M&E.	Own.	Wa-5A.	DR.	36x5	36x10	
Wilcox.....F5	4350	Bu-ATU	4 1/2 x 6 1/2	M&E.	Own.	Wa-5A.	DR.	36x5	40x5	
Wilson.....C1	2270	Co-J4.	3 3/4 x 5	B&B.	Cot.	Ti-6532.	WO.	34x5n	34x5n	
Wilson.....F1 1/2	2825	Co-K4.	4 1/2 x 5 1/2	B&B.	Cot.	Ti-6400.	WO.	36x3 1/2	36x5k	
Wilson.....EA2 1/2	3685	Co-L4.	4 1/2 x 5 1/2	B&B.	Cot.	Ti-6500.	WO.	36x1k	36x7k	
Wilson.....G3 1/2	3685	Co-L4.	4 1/2 x 5 1/2	B&B.	Cot.	Ti-6600.	WO.	36x5k	36x5dk	
Wilson.....H5	4520	Co-B2.	4 1/2 x 6	B&B.	Cot.	Ti-6752.	WO.	36x6k	40x8dk	
Yellow Cab.....M22 3/4	1590	Co-V4.	3 3/4 x 5	B-L.	B-L.	Ti-6752.	SB.	33x4 1/2	33x4 1/2	
Yellow Cab.....M42 1 1/4	1640	Co-V4.	3 3/4 x 5	B-L.	B-L.	Ti-6352.	WO.	35x5n	35x5n	

CANADIAN										
Goftredson.....20	3/4-1	\$1685	Bu-WTU	3 3/4x5 1/2	B-L.	B-L.	Ti-6250.	WO.	34x5n	34x5n
Goftredson.....40	1 1/4-2	2300	BU-GTU	4 1/2x5 1/2	B-L.	B-L.	Ti-6400.	WO.	36x6n	38x7n
Goftredson.....50	2 1/4-2	3000	Bu-ETU	4 1/2x5 1/2	B-L.	B-L.	Ti-6560.	WO.	36x4	36x8
Goftredson.....80	4	3975	Bu-YTU	4 1/2x6	B-L.	B-L.	Ti-6666.	WO.	34x5	36x12
Goftredson.....100	5	4800	Bu-BTU	5 1/2x6 1/2	B-L.	B-L.	Ti-6760.	WO.	36x6	40x14
Mapleleaf.....1	1 1/4	3000	Hi-300.	3 3/4x5 1/2	Ful.	Ful.	Sh-1501.	WO.	34x5n	36x6n
Mapleleaf.....AA	2	3600	Hi-400.	4 1/2x5 1/2	Ful.	Ful.	Sh-103.	WO.	36x4	36x7
Mapleleaf.....BB	3	4050	Hi-500.	4 1/2x5 1/2	Ful.	Ful.	Sh-21.	WO.	36x4	36x4d
Mapleleaf.....CC	4	4800	Hi-200.	4 1/2x5 1/2	Ful.	Ful.	Sh-31.	WO.	36x5	36x5d
Mapleleaf.....DD	5	5625	Hi-1600.	4 1/2x5 1/2	Ful.	Ful.	Sh-51.	WO.	36x6	36x6d
National.....FA	1	2899	Wa-BUX	3 3/4x5 1/2	B-L.	B-L.	Ti-6352.	WO.	35x5n	35x5n
National.....GA	1 1/4	3699	Wa-BUX	3 3/4x5 1/2	B-L.	B-L.	Ti-6400.	WO.	34x4k	34x6k
National.....HD	2 1/4	4200	Wa-CU.	4 1/2x5 1/2	H-S.	B-L.	Ti-6500.	WO.	36x5	36x10
National.....NB	3 1/4	4200	Wa-DU.	4 1/2x5 1/2	H-S.	B-L.	Ti-6666.	WO.	36x6	40x12
National.....OA	5	5395	Wa-EU.	5 1/2x6 1/2	H-S.	B-L.	Ti-6760.	WO.	36x7	40x14
Veteran.....M	1 1/4	2899	Bu-CTU	3 3/4x5 1/2	B&B.	Cot.	Sh-1501.	WO.	34x5n	34x5n
Veteran.....P	2	3699	Bu-HTU	4 1/2x5 1/2	B&B.	Cot.	Sh-21.	WO.	36x4	36x7
Veteran.....R	3	4200	Bu-HTU	4 1/2x5 1/2	B&B.	Cot.	Sh-21.	WO.	36x4	36x7
Veteran.....S	4	5395	Bu-YTU	4 1/2x6	B&B.	Cot.	Sh-31.	WO.	36x5	36x10

Current Tractor Specifications

MAKE & MODEL	Drawbar-Pulley Rating	Recommended No. of 14 Ins. Plovs	Price	ENGINE			Belt Pulley, Dimensions Dia. & Face (Ins.)	Weight (Lbs.)	TRACTION MEMBERS	
				Make	No. of Cyls. Bore & Stroke	Recom. Fuel			Dimensions, Diameter & Face (Ins.)	Type Final Drive
Allis-Chalmers.....	6-12	1	\$295	LeR.	4-3 1/2 x 4 1/2	G.....	10 x 5 1/2	2,500	48x 6	W
Allis-Chalmers.....	15-25	3	1185	Mid.	4-4 1/2 x 5 1/2	G.....	12 1/2 x 6 1/2	4,700	46x12	W
Allis-Chalmers.....	20-35	4	1885	Own.	4-4 1/2 x 6 1/2	GK.....	13 x 7 1/2	6,150	50x12	W
Allwork.....D	20-38	4-5	1695	Own.	4-5 x 7	KD.....	14 x 7 1/2	6,500	48x14	W
Allwork.....G	14-28	3	1495	Own.	4-4 1/2 x 6	KD.....	11 x 7	4,800	48x12	W
Allwork.....C	16-30	3	1293	Own.	4-5 x 6	KD.....	13 3/4 x 7 1/2	5,200	48x12	W
Aultman-Taylor.....	15-30	3-4	1900	Own.	4-5 x 6 1/2	GKD.....	20 x 8	7,800	70x12	W
Aultman-Taylor.....	22-45	4-6	3100	Own.	4-5 1/2 x 8	GKD.....	20 x 11	12,500	70x20	W
Aultman-Taylor.....	30-60	8-10	4400	Own.	4-7 x 9	GKD.....	24 x 11	22,500	90x24	W
Avery.....	15 1/2	3-4	.....	Own.	4-4 1/2 x 6	GKD.....	16 x 7 1/2	4,750	50x12	W
Avery.....	20-35	4-5	.....	Own.	4-4 1/2 x 7	GKD.....	16 x 7 1/2	7,500	60x16	W
Avery.....	25-50	5-6	.....	Own.	4-6 1/2 x 7	GKD.....	22 x 8 1/2	12,500	69x20	W
Avery.....	45-65	8-10	.....	Own.	4-7 1/2 x 8	GKD.....	26 x 10	22,000	87 1/2 x 24	W
Avery, Tr. Runner	.....	3	.....	Own.	4-4 1/2 x 5 1/2	GKD.....	12 x 6 1/2	5,000	x 8 1/2	T
Avery, Road Razer	.....	3	.....	Own.	6-3 x 4	G.....	None.....	4,600	42x 6	W
Bates (St. Mule) H	15-25	3	.....	Mid.	4-4 1/2 x 5 1/2	G.....	12 x 8 1/2	3,600	48x10	W
Bates (St. Mule) F	18-25	3	.....	Mid.	4-4 1/2 x 5 1/2	G.....	12 x 8 1/2	4,850	56x10	T
Bates (St. Mule) G	25-35	4	.....	Mid.	4-4 1/2 x 6	G.....	12 x 8 1/2	6,500	x 10	T
Bates (St. Mule) 40	30-40	4	.....	Mid.	4-4 1/2 x 6	GD.....	12 x 8 1/2	8,500	84x10	T
Best.....B	25-35	4	4250	Ste.	4-4 1/2 x 6 1/2	G.....	12 x 9	5,500	64x12	T
Best.....	30-40	4	.....	Own.	4-4 1/2 x 6 1/2	GKD.....	12 x 8	8,100	68x11 1/2	T
Best.....	60-80	9	.....	Own.	4-6 1/2 x 8 1/2	GKD.....	16 x 10	18,500	89x20	T
Bryan.....Steam	15-30	3	2500	Own.	2-4 x 5	KD.....	18 x 7	5,500	52x12	W
Case.....	12-20	3	1095	Own.	4-4 1/2 x 5	GKD.....	14 1/2 x 6 1/2	4,230	42x12	W
Case.....	15-27	3-4	1350	Own.	4-4 1/2 x 6	GKD.....	16 x 6 1/2	6,600	52x14	W
Case.....	22-40	4-5	2850	Own.	4-5 1/2 x 6 1/2	GKD.....	16 1/2 x 8 1/2	10,700	56x16	W
Case.....	40-72	8-10	4900	Own.	4-7 x 9	GKD.....	19 1/2 x 10 1/2	21,200	72x20	W
Caterpillar.....2 Ton	15-30	3	1975	Own.	4-4 1/2 x 5 1/2	G.....	11 1/2 x 6 1/2	4,000	.....	T
Caterpillar.....5 Ton	25-40	4	3975	Own.	4-4 1/2 x 6	G.....	12 x 8 1/2	9,400	.....	T
Caterpillar.....10 Ton	40-60	6	6050	Own.	4-6 1/2 x 7	G.....	14 x 10 1/2	19,500	.....	T
Cletrac.....F	9-16	2	745	Own.	4-3 1/2 x 4 1/2	GK.....	7 x 5	1,930	42x 5 1/2	T
Cletrac.....W	12-20	2	1,345	Own.	4-4 1/2 x 5 1/2	GK.....	8 x 6	3,455	48x 8	T
Eagle.....F	12-22	3	.....	Own.	2-7 x 8	G.....	.....	5,850	48x12	W
Eagle.....H	16-30	4	.....	Own.	2-8 x 8	G.....	.....	9,100	48x12	W
E.B.....AA	12-20	3	.....	Own.	4-4 1/2 x 5	GK.....	12 x 6 1/2	4,550	54x12	W
E.B.....Q	12-20	3	.....	Own.	4-4 1/2 x 5	GK.....	12 x 8	6,500	60x12	W
E.B.....	16-32	4	.....	Own.	4-5 1/2 x 7	GK.....	16 x 9	9,400	72x16	W
Fageol.....	19-12	2	1175	Lyc.	4-3 1/2 x 5	G.....	9 1/2 x 6 1/2	2,543	42x12	W
Fordson.....	18-25	2	395	Own.	4-4 x 5	K.....	13 x 7	5,800	60x10	W
Frick.....A	12-20	2	1000	Erd.	4-4 x 5	K.....	13 x 7	5,800	60x10	W
Frick.....C	15-28	3	1600	Bea.	4-4 1/2 x 6	GK.....	13 x 7	6,730	60x12	W
Gray.....DU	18-36	4	2150	Wau.	4-4 1/2 x 6 1/2	G.....	10 x 8	6,200	54x54	Dr
Gray.....EU	22-40	4	2385	Wau.	4-5 1/2 x 6 1/2	G.....	13 x 6 1/2	6,900	54x54	Dr
Hart-Parr.....20	20-20	2	.....	Own.	2-5 1/2 x 6 1/2	K.....	13 x 6 1/2	3,973	46x10	W
Hart-Parr.....30	30-30	3	.....	Own.	2-6 1/2 x 7	K.....	14 x 8 1/2	5,220	52x10	W
Hart-Parr (Road)	30-30	3	.....	Own.	2-6 1/2 x 7	K.....	14 x 8 1/2	7,560	52x18	W
Heider.....D	9-16	2	.....	Wau.	4-4 1/2 x 5 1/2	GK.....	12 x 6	4,000	54x 8	W
Heider.....C	12-20	3	.....	Wau.	4-4 1/2 x 6 1/2	GK.....	14 x 7	6,000	57x10	W
Heider.....M	5-10	3	.....	LeR.	4-3 1/2 x 4 1/2	G.....	8 x 5	2,800	46x 6	W
Huber.....(Light 4)	12-25	3	985	Wau.	4-4 1/2 x 5 1/2	GK.....	13 x 7	5,000	60x10	W
Huber.....(Super 4)	15-30	3	.....	Mid.	4-4 1/2 x 6	G.....	10 x 6	6,000	48x 7	W
LaCrosse.....M	6-12	1	.....	Own.	2-4 x 6	K.....	11 x 7 1/2	3,800	56x10	W
LaCrosse.....H	12-24	3	.....	Own.	2-6 x 7	K.....	15x	4,200	.....	W
Lauson.....S	12-25	3	.....	Mid.	4-4 1/2 x 5 1/2	G.....	16 1/2 x 8 1/2	6,200	.....	W
Lauson.....T	15-30	4	.....	Bea.	4-4 1/2 x 6	GKD.....	14 x 7	4,800	50x12	W
Leader.....B	12-18	2	.....	Own.	2-6 1/2 x 6	GK.....	14 x 7 1/2	5,800	52x12	W
Leader.....N	16-32	3-4	.....	Chi.	4-5 x 6	GK.....	14 x 7 1/2	.....	66x 9	T
Leader.....GU	16-32	3-4	.....	Chi.	4-5 x 6	GK.....	14 x 7 1/2	.....	66x 9	T
Lincoln.....A	15-30	3	1,600	Bud.	4-4 1/2 x 6	GK.....	12 x 7	5,000	40x14	W
Little Giant.....B	16-22	4	.....	Own.	4-4 1/2 x 5	GK.....	10 x 7	5,200	54x14	W
Little Giant.....A	26-35	6	.....	Own.	4-5 1/2 x 6	GK.....	13 1/2 x 9	8,700	66x20	W
Lombard.....	100-12	10	.....	Own.	6-5 1/2 x 7	G.....	.....	19,000	x12	W
London.....	12-25	3	.....	Mid.	4-4 1/2 x 5 1/2	G.....	.....	.....	48x12	W

MAKE & MODEL	Drawbar-Pulley Rating	Recommended No. of 14 Ins. Plovs	Price	ENGINE			Belt Pulley, Dimensions Dia. & Face (Ins.)	Weight (Lbs.)	TRACTION MEMBERS	
				Make	No. of Cyls. Bore & Stroke	Recom. Fuel			Dimensions, Diameter & Face (Ins.)	Type Final Drive
McCormick-Deering	10-20	2	\$785	Own.	4-4 1/2 x 5	GKD.....	15 1/4 x 7	3,700	42x12	W
McCormick-Deering	15-30	3	1250	Own.	4-4 1/2 x 6	GKD.....	16 3/4 x 8	5,750	50x12	W
Minneapolis	12-25	3-4	.....	Own.	4-4 1/2 x 7	.....	.....	6,600	56x12	W
Minneapolis	17-30	3-4	.....	Own.	4-4 1/2 x 7	.....	.....	6,400	54x12	W
Minneapolis	22-44	4-5	.....	Own.	4-6 x 7	.....	.....	12,410	62x20	W
Minneapolis	35-70	8-10	.....	Own.	4-7 1/2 x 9	.....	.....	22,500	85x30	W
Moline (Un.) D3	9-8	2-3	725	Own.	4-3 1/2 x 5	G.....	9 x 6 1/2	4,103	52x 8	W
Moline (Orc.) D	9-8	2-3	725	Own.	4-3 1/2 x 5	G.....	9 x 6 1/2	3,893	44x 8	W
Monarch.....C	20-30	4	3,700	Bea.	4-4 1/2 x 6	GK.....	16 x 8 1/2	8,700	66x12	T
Monarch.....E	25-40	4	4,200	Bea.	4-4 1/2 x 6	GK.....	.....	12,000	67x12	T
Monarch.....D	35-60	6	5,500	Bea.	6-4 1/2 x 6	GK.....	.....	15,000	89x12	T
Nichols-Shepard	20-42	6-8	2,600	Own.	2-8x10	GK.....	22 x 8	13,500	64x20	W
Nichols-Shepard	25-50	6-8	3,320	Own.	2-9x12	GK.....	24 x 9	20,500	69x28	W
Nichols-Shepard	35-70	8-12	4,030	Own.	2-10 1/2 x 14	GK.....	30 x 12	30,000	73x32	W
Pioneer.....G	18-36	4	.....	Own.	1-5 1/2 x 6	GK.....	.....	6,500	60x18	W
Pioneer.....C	10-75	10	.....	Own.	1-7 x 8	G.....	17 1/2 x 15	24,000	96x24	W
Rumely OilPull	12-20	3	.....	Own.	2-6 x 8	KD.....	19 x 7	6,682	51x12	W
Rumely OilPull	16-30	4	.....	Own.	2-7 x 8 1/2	KD.....	23 x 8 1/2	9,600	56x16	W
Rumely OilPull	20-40	6	.....	Own.	2-8 x 10	KD.....	26 x 9	12,820	64x20	W
Rumely OilPull	30-60	8-10	.....	Own.	2-10 x 12	KD.....	36 x 11	26,700	80x30	W
Russell.....	15-30	3-4	.....	Chi.	4-5 x 6 1/2	J-K	12 1/2 x 7	6,000	56x14	W
Russell.....	20-40	4-5	.....	Chi.	4-5 1/2 x 7	GK.....	12 1/2 x 8	7,900	60x16	W
Russell.....	30-60	8-10	.....	Own.	4-8 x 10	GK.....	24 x 10	22,550	84x22	W
Shaw-Enoch (Gr.)	.....	.....	.....	LeR.	4-3 1/2 x 4 1/2	G.....	None.....	4,400	48x 8	W
Topp-Stewart.....B	30-45	4	.....	Wau.	1-4 1/2 x 6 1/2	G.....	.....	7,800	42x12	W
Toro.....	6-10	2	675	LeR.	4-3 1/2 x 4 1/2	G.....	8 x 5	2,900	41x 9	W
Townsend.....	10-20	2-3	800	Own.	2-6 1/2 x 7	GKD.....	18 x 7	4,500	48x12	W
Townsend.....	15-30	3-4	1,350	Own.	2-7 x 8	GKD.....	20 x 8	6,500	56x18	W
Townsend.....	25-50	4-8	2,500	Own.	2-8 1/2 x 10	GKD.....	22 x 10	11,500	60x24	W
Traylor.....	6-12	1	500	LeR.	1-3 1/2 x 4 1/2	G.....	8 x 6	1,750	38x10	W
Twin City.....	12-20	3	1200	Own.	1-4 1/2 x 6	GKD.....	16 x 6 1/2	5,000	50x12	W
Twin City.....	20-35	5	2750	Own.	1-5 1/2 x 6 1/2	GKD.....	21 x 8 1/2	9,200	60x20	W
Twin City.....	40-65	8	4750	Own.	1-7 1/2 x 9	GKD.....	23 x 10 1/2	24,000	84x24	W
Uncle Sam.....C-20	12-20	2-3	990	Wei.	4-4 x 5 1/2	GK.....	16 x 6	3,000	46x12	W
Uncle Sam.....B-19	20-30	3-4	1,535	Bea.	4-4 1/2 x 6	GKD.....	11 x 9 1/4	4,650	50x12	W
Uncle Sam.....D-21	20-30	3-4	1,485	Bea.	4-4 1/2 x 6	GKD.....	11 x 9 1/4	4,600	50x12	W
Wallis.....	OK	15-27	3	Own.	4-4 1/2 x 5 1/2	GKD.....	18 1/2 x 7	3,630	48x12	W
Waterloo Boy.....N	12-25	3	.....	Own.	2-6 1/2 x 7	GKD.....	14 x 8	5,869	52x12	W
Wetmore.....	12-25	3	1,185	Wau.	4-4 x 5 1/2	GK.....	12 x 7	2,900	46x10	W
Wisconsin.....	16-30	3-4	1,750	Chi.	4-5 x 6 1/2	GK.....	16 x 8	5,600	52x12	W
Wisconsin.....	22-40	4-5	2,550	Chi.	4-5 1/2 x 7	GK.....	16 x 9	7,500	52x12	W
Yuba (Ball Tread)	15-25	3	2,750	Wis.	4-4 1/2 x 6	D.....	12 x 6 1/2	5,750	36x12	T
Yuba (Ball Tread)	25-40	6	4,250	Wis.	4-5 1/2 x 7	D.....	12 x 8 1/2	10,130	48x17 1/2	T

GARDEN TRACTORS										
MAKE & MODEL	Drawbar-Pulley Rating	Recommended No. of 14 Ins. Plovs	Price	ENGINE			Belt Pulley, Dimensions Dia. & Face (Ins.)	Weight (Lbs.)	TRACTION MEMBERS	
				Make	No. of Cyls. Bore & Stroke	Recom. Fuel			Dimensions, Diameter & Face (Ins.)	Type Final Drive
Aro.....F	3-6	1	\$385	Own.	1-4 1/2 x 5	G.....	6 x 4 1/2	1,000	30x 4	W
Beeman.....Jr.	1 1/2-1	1	180	B&S	1-2 1/2 x 2 1/2	G.....	3 1/4 x 2	190	16x 3	W
Beeman.....K	1 1/2-4	1	205	Own.	1-3 1/2 x 4 1/2	G.....	3 1/2 x 4 1/2	550	25x 3 1/2	W
Bolens.....	1	1	180	B&S	1-2 1/2 x 2 1/2	G.....	3 x 2	190	10x 3	W
Centaur.....	1923 1/2	1	345	N-W	1-4 1/2 x 4 1/2	GK.....	4 x 6	700	28x 4	W
Do-It-All (Jack)	2 1/2-6	1	395	Own.	1-3 3/4 x 3 3/4	G.....	3 x 3	750	.....	W
Do-It-All (Baby)	2 1/2-6	1	495	Own.	1-4 1/2 x 5	K.....	2 x 2	1,200	26x 2 1/2	W
Do-It-All (Twin 12)	4-15	1	495	Own.	2-3 3/4 x 3 3/4	GK.....	4 x 4	800	32x 4	W
Kinkade.....	1 1/2-3	1	190	Own.	1-3 x 3	G.....	None.....	180	22x 5 1/2	W</

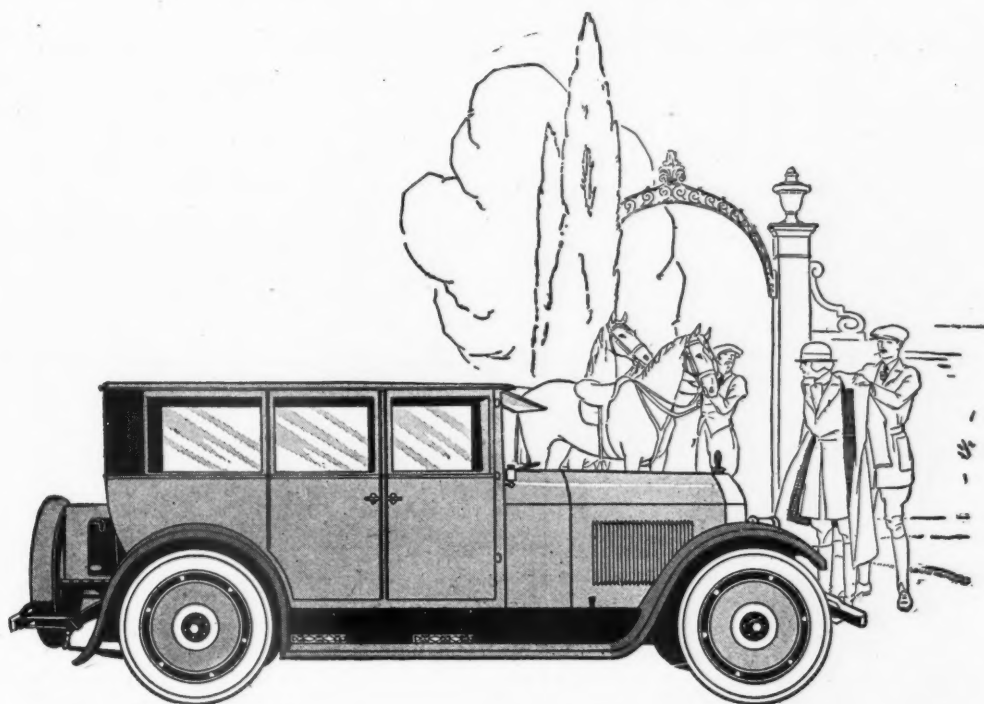
GARDEN TRACTORS

Are.....	F	3-6	1	\$385	Own.	1-2 1/2 x 5	G.....	3 x 4 1/2	1,000	30x 4	W
Beeman.....	Jr.	1 1/2-1	1	180	B.&S.	1-2 1/2 x 2 1/2	G.....	3 1/2 x 2	190	16x 3	W
Beeman.....	K	1 1/2-1	1	265	Own.	1-3 1/2 x 4 1/2	G.....	3 1/2 x 4 1/2	550	25x 3 1/2	W
Bolens.....		1923	1	180	B.&S.	1-2 1/2 x 2 1/2	G.....	3 x 2	190	10x 3	W
Centaur.....		1923	1	345	N-W.	1-4 1/2 x 4 1/2	GK.....	4 x 6	700	28x 4	W
Do-It-All.....	(Jack)	2 1/2-5	1	395	Own.	1-3 1/2 x 3 1/2	G.....	3 x 3	750		W
Do-It-All.....	(Baby)	2 1/2-6	1	495	Own.	1-4 1/2 x 5	K.....	2 x 2	1,200	26x 2 1/2	W
Do-It-All.....	(Twin 12)	4-15	1	495	Own.	2-3 3/4 x 3 3/4	GK.....	4 x 4	800	32x 4	W
Kinkade.....		1 1/2-3	1	190	Own.	1-3 x 3	G.....	None.	180	22x 5 1/2	W
M.B.M. Red.....	E	1-4	1	250	Own.	1-3 3/4 x 4	G.....	3 x 3 3/4	410	20x 3	W
Motor Maculculator.....			1	148	Own.	1-2 1/2 x 3 1/2	G.....	None.	210	19 1/2 x 3	W
N.B.....		2 6	1	375	Own.	2-2 1/4 x 4	G.....	5 1/2 x 4 1/2	750	32x 4	W
Utilitor.....	501	2 1/2-4	1	295	Own.	1-3 1/2 x 4 1/2	G.....	4 1/2 x 3 1/2	750	24 1/2 x 4	W
Utilitor.....	501A	2 1/2-4	1	340	Own.	1-3 1/2 x 4 1/2	G.....	4 1/2 x 3 1/2	925	24 1/2 x 4	W

Current Passenger Car Specifications

(This list comprises cars distributed on a national basis)

PRICES						Wheel Base (Ins.)	Tire Size (Ins.)	NAME AND MODEL	ENGINE				ELECTRICAL SYSTEM		Clutch: Type and Make	Gearset Make	Universal: Type and Make	REAR AXLE			
OPEN MODELS			CLOSED MODELS						Make	No. of Cyls. Bore and Stroke	Horse Power Rating (N.A.A.C.)	Carburetor Make	Generator and Starter Make	Ignition Make				Type and Make	Gear Ratio		
2-3 Pass.	4-5 Pass.	6-7 Pass.	Sport Models	2-3 Pass.	4-5 Pass.	6-7 Pass.															
\$1950e	\$1785	\$1850	\$1885e	\$2250	\$2485		127	33x4 1/2	American D-66	H-S.	6-31/2x5	29.40	Strom.	G-D.	A-K.	s-p	B&B.	B & B.	m Hartford.	F Salis.	4.50
	1195		1395e		1495	d1795p	114	32x4	Anderson 41	Cont.	6-31/2x4 1/4	23.44	Zenith.	West.	West.	s-p	B&B.	Durston.	f Universal.	1/2 F Salis.	4.75
1495	1405	1505	1785b 1915e	1905e	1995d		122	32x4	Anderson Series 50	Cont.	6-31/2x4 1/2	27.34	Rayfield.	Remy.	Remy.	s-p	B&B.	Durston.	f Universal.	1/2 F Salis.	4.62
	1535				2200		132	33x4	Anderson Series 50	Cont.	6-31/2x4 1/2	27.34	Rayfield.	Remy.	Remy.	s-p	B&B.	Durston.	f Universal.	1/2 F Salis.	4.62
	2800	2900		3025	3750	\$3850	130	32x4	Apperson 6	Own.	6-31/2x4 1/4	23.44	Strom.	Remy.	Remy.	s-p	Rockford.	Mech.	m Thierner.	1/2 F Col.	5.10
	1165		1275d		1535		130	33x5	Apperson 8-23-S	Own.	8-31/2x5	33.80	Johnson.	Bijur.	Remy.	m-d	Own.	Own.	m Thierner.	1/2 F Col.	4.25
	1725		1985d		2045	2345	114	31x4	Auburn 6-43	Cont.	6-31/2x4 1/4	23.44	Strom.	Remy.	Remy.	s-p	B&B.	Warner.	m Detroit.	1/2 F Col.	4.60
	1395		1495d		1850		122	32x4 1/2	Auburn 6-63	Own.	6-31/2x5	25.35	Strom.	Remy.	Remy.	s-p	B&B.	Warner.	m Thierner.	1/2 F Col.	4.60
					2250p		118	32x4	Barley	Cont.	6-31/2x4 1/4	23.44	Strom.	Deleo.	Deleo.	s-p	B&B.	Fuller.	f M&E.	1/2 F Col.	5.10
805	885	725g		1175	1395		109	31x4	Buick 1923-34-5-6-7-38	Own.	4-31/2x4 1/4	18.23	Marvel.	Deleo.	Deleo.	m-d	Own.	Own.	m Own.	1/2 F Own.	1.66
					1325																
1175	1195	975g		1035	1985		118	32x4	Buick 1923-41-4-5-47	Own.	6-31/2x4 1/2	27.34	Marvel.	Deleo.	Deleo.	m-d	Own.	Own.	m Own.	F Own.	1.10
		1435	1625a 1675e		1895	2195	124	33x4 1/2	*Buick 1923 48-9-50-4-55	Own.	6-31/2x4 1/2	27.34	Marvel.	Deleo.	Deleo.	m-d	Own.	Own.	m Own.	F Own.	1.70
2885	2885	2885		3075e	3950	4300g	132	33x5	Cadillac 61	Own.	8-31/2x5 1/4	31.25	Own.	Deleo.	Deleo.	m-d	Own.	Own.	m Spicer.	F Tim.	0.4
					3750	3990															
1750	1790		2230d	2480	2575		122	32x4 1/2	Case X	Cont.	6-31/2x4 1/2	27.34	Rayfield.	Deleo.	Deleo.	m-d	Own.	Own.	f Sneed.	1/2 F Col.	4.66
1185	1185		1991	1950e	2480	2975	129	34x4 1/2	Case W	Cont.	6-31/2x5 1/4	31.54	Rayfield.	Deleo.	Deleo.	m-d	Own.	Own.	f Arrac.	1/2 F Col.	4.45
			1445e	1505	1885		117	32x4	Chalmers 1923	Own.	6-31/2x4 1/2	25.35	Strom.	A-L.	Remy.	m-d	Own.	Own.	m Hardy.	1/2 F Adams.	5.12
1595	1485	1345	1635	1785e	2085		122	32x4	Chalmers 1923	Own.	6-31/2x4 1/2	25.35	Strom.	A-L.	Remy.	m-d	Own.	Own.	m Hardy.	1/2 F Adams.	5.12
	1685				2385		123	32x4	Chandler Six	Own.	6-31/2x5	29.40	Strom.	Bosch.	Bosch.	s-p	B&B.	Own.	f Own.	1/2 F Own.	4.45
					2270	2995g															
510	525	425g		680	860		103	30x3 1/2	Chevrolet Superior	Own.	4-31/2x4	21.76	Zenith.	Remy.	Remy.	e	Own.	Own.	m Own.	1/2 F Own.	3.77
					850																
580	595			750	920		103	30x3 1/2	Chevrolet M	Own.	4-31/2x3 1/2	19.60	Carter.	Remy.	Remy.	m-d	Own.	Own.	m Mech.	1/2 F Own.	1.44
					930																
1085	995		1095d	1195	1295		112 1/2	31x4	Cleveland 42	Own.	6-31/2x4 1/2	22.50	Strom.	Bosch.	Bosch.	s-p	B&B.	Own.	m Mech.	1/2 F Own.	1.90
			1260d	1193d	1595p																
2685	2685	2685		3285	3685		127 1/4	33x5	Cole 890	North.	8-31/2x4 1/2	39.20	Johnson.	Deleo.	Deleo.	m-d	North.	North.	m Spicer.	F Col.	1.70
	1475			1925e	1995		115	32x4	Columbia Big Six	Cont.	6-31/2x4 1/2	27.34	Strom.	A-L.	A-K.	s-p	B&B.	Durston.	m Spicer.	1/2 F Tim.	4.75
985e	1135		1395d	1295	1465		115	31x4	Columbia Light Six	Cont.	6-31/2x4 1/2	23.44	Strom.	A-L.	A-L.	s-p	B&B.	Durston.	m Spicer.	1/2 F Tim.	5.10
	1095			1685																	
1195	1235		1495b 1565e	1875	2055		116	32x4	Courier	Falls.	6-31/2x4 1/4	23.44	Strom.	West.	A-K.	s-p	B&B.	Muncie.	f Flexite	1/2 F Col.	5.00
				2065																	
	3100	3130				4500	138	33x4 1/2	Crawford 23-6-70	Cont.	6-31/2x5 1/4	31.54	Zenith.	West.	Bosch.	m-d	B-L.	B-L.	m Spicer.	1/2 F Tim.	1.23
			3500e		4500		138	33x5	Crawford-Dagmar 6-70	Cont.	6-31/2x5 1/4	31.54	Zenith.	West.	Bosch.	m-d	B-L.	B-L.	m Spicer.	1/2 F Tim.	1.23
	5800	6300		7050			142	33x5	Cunningham V4	Own.	8-31/2x5	45.00	Strom.	Deleo.	Deleo.	m-d	Own.	Own.	f Sneed.	F Tim.	1.23
4350	4350e	4350	4350e	5300	5350	6000	132	33x5	Daniels 23-38	Own.	8-31/2x5 1/4	39.20	Strom.	Deleo.	Deleo.	m-d	Own.	Own.	m Spicer.	F Tim.	1.23
					6250	6900g															
1295	1295		1495e	1595	1795	1795e	115	31x4	Davis 71	Cont.	6-31/2x4 1/2	23.44	Strom.	Deleo.	Deleo.	s-p	B&B.	Warner.	m M&E.	1/2 F Tim.	5.10
1595	1595		1695d	2095			120	32x4 1/2	Davis 63	Cont.	6-31/2x4 1/2	27.34	Strom.	Deleo.	Deleo.	s-p	B&B.	Warner.	m Peters.	1/2 F Tim.	5.15
850	880		980	1440			114	32x4	Dodge Brothers	Own.	4-31/2x4 1/2	24.03	Stewart.	N.E.	N.E.	m-d	Own.	Own.	m Own.	1/2 F Own.	1.16
				1185																	
	3950	3950	4150e	4985	6800	4310	132	33x5	Dorris 6-80	Own.	6-4 x5	38.40	Strom.	West.	Bosch.	m-d	Own.	Warner.	m Spicer.	1/2 F Tim.	1.23
870	885		995e	1240	1350		108	31x4	Dort 23-18	Lye.	4-31/2x5	19.60	Carter.	Bosch.	Conn.	m-d	Detlafl.	Own.	m Mech.	1/2 F Flint.	1.66
1010	1025		1135e	1355	1465		115	31x4	Dort 25-20	Falls.	6-31/2x4 1/2	23.44	Carter.	Bosch.	Bosch.	m-d	Detlafl.	Own.	m Mech.	1/2 F Flint.	1.66
5750	5500	5900	5750e	7250	7500		134	33x5	Duesenberg Straight 8	Own.	8-27x5	26.45	Strom.	Deleo.	Deleo.	s-p	Own.	Own.	f Clinax.	1/2 F Own.	4.45
890	890		1065d	1305	1365		109	31x4	Duesenberg A-22	Cont.	4-31/2x4 1/4	24.03	Till.	A-L.	A-L.	s-p	Own.	Warner.	m Spicer.	1/2 F Adams.	1.33
				1465																	
1600	1650		2250	2400			123 1/2	32x4 1/2	Durant B-22	Inst.	6-31/2x4 1/2	25.35	Rayfield.	A-L.	A-L.	s-p	Ansted.	Warner.	m Spicer.	1/2 F Tim.	5.15
1485	1095		1275d	1395e	1595		112	32x4	Earl 40	Own.	4-31/2x5 1/2	18.91	Seo.	A-L.	Conn.	s-p	B&B.	Own.	f Own.	1/2 F Own.	4.87
	965		1095		1425		112	32x4	Elcar 4-40	Lye.	4-31/2x5	21.03	Strom.	Deleo.	Deleo.	s-p	B&B.	Warner.	m Peters.	1/2 F Salis.	1.50
1395	1395		1595d	1975	1995		118	32x4	Elcar 6-60	Cont.	6-31/2x4 1/2	27.34	Strom.	Deleo.	Deleo.	m-d	Warner.	Warner.	m Spicer.	1/2 F Salis.	4.50
	1045			1145	1145		108 1/2	32x4	Essex	Own.	4-31/2x5	18.23	Own.	Bosch.	Bosch.	m-d	Own.	Own.	m Spicer.	1/2 F Own.	4.66
	1195		1195	1895e	1985		120	32x4 1/2	Flint	Cont.	6-31/2x5	27.34	Strom.	A-L.	A-L.	s-p	Own.	Warner.	m Spicer.	1/2 F Adams.	1.41
269r	298e	235g		530	595		100	30x3 1/2	Ford T	Own.	4-31/2x4 1/2	22.50	Own.	Own.	Own.	s-p	Own.	Own.	m Own.	1/2 F Own.	3.63
					725																
3900	3900			4900	4900		132	32x4 1/2	Fox 7F	Own.	6-31/2x5	27.34	Zen th.	West.	Scintilla	m-d	B-L.	B-L.	m Spicer.	1/2 F Tim.	1.90
	1950			2750e	2250	\$3150d	115	32x4	Franklin 10	Own.	6-31/2x4	25.35	Own.	A-K.	A-K.	s-p	B&B.	Own.	m Spicer.	1/2 F Own.	4.73
				2850f	12850																
995	995		1145e	1145	1445		112	32x4	Gardner Series 5	Lye.	4-31/2x4	21.76	Zenith.	West.	West.	s-p	B&B.	Mech.	m Peters.	1/2 F Flint.	4.80
490	520			715	785		100														



\$1795

f.o.b factory

The **Coachbilt Sport Sedan**

COACHBILT Anderson Aluminum Body; 6-cylinder Red Seal Continental Motor; Westinghouse Starting, Lighting and Ignition; Borg & Beck Clutch; 5 Steel Disc Wheels with 5 Cord Tires and Tire Cover; Luggage Trunk on rear fitted with 2 Suit Cases; Bumpers and Snubbers, front and rear; German Silver Radiator Shell; Dome and Reading Lights; Vanity Case and Smoking Set; Heater; Sun Shade; Foot Dimmer for Headlights; Color—Gray with black fenders and black upper body; Wheelbase—115 inches; averages 19 miles per gallon of gasoline.

Other models: Touring Car \$1195; Sport Touring Car \$1395; Coach \$1495; Sedan \$1695, f. o. b. factory.

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Anderson Motor Company, Rock Hill, S. C.

The Coachbilt
ANDERSON
ALUMINUM SIX

Current Passenger Car Specifications

(This list comprises cars distributed on a national basis)

PRICES						Wheel Base (Ins.)	Tire Size (Ins.)†	NAME AND MODEL	ENGINE				ELECTRICAL SYSTEM			Clutch: Type and Make	Gearset Make	Universal: Type and Make	REAR AXLE		
OPEN MODELS			CLOSED MODELS						Make	No. of Cyls. Bore and Stroke	Horse Power Rating (N.A.A.C.)	Carburetor Make	Generator and Starter Make	Ignition Make	Type and Make				Type and Make	Type and Make	Gear Ratio
2-3 Pass.	4-5 Pass.	6-7 Pass.	2-3 Pass.	4-5 Pass.	6-7 Pass.																
\$2385	\$1835	\$2335	\$2385c			124	32x4½	Kissel.....45	Own.	6-3½x5½	26.38	Strom.	Remy.	Remy.	m-d Warner.	Warner.	m Spicer.	F	Own.	3.92	
3985	4090	4090				132	33x5	LaFayette.....23	Own.	8-3½x5½	33.80	Johnson.	Deleo.	Deleo.	m-d Own.	Own.	m Own.	F	Own.	4.58	
1795	1795	2195	2145d	2345	2345	123	32x4½	Lexington.....10-D	Anst.	6-3½x4½	25.35	Rayfield.	G-D.	Conn.	m-d Own.	Warner.	f Sneed.	F	Salis.	5.10	
1575	1395		1575	2345	2345	117	32x4	Liberty.....10-D	Own.	6-3½x5	23.44	Strom.	Wagner	Wagner	s-p B&B.	Detroit.	m Spicer.	½F	Tim.	4.80	
3800	3800c	3800	4600c	4400	4900	136	33x5	Lincoln.....	Own.	8-3½x5	36.45	Strom.	Deleo.	Deleo.	m-d Own.	Own.	m Spicer.	F	Tim.	4.58	
8900	9500c	9600		11750	11630	142	35x5	Locomobile.....Series 8	Own.	6-4½x5½	48.60	Ball&B.	West.	Deleo.	m-d Own.	Own.	m Own.	F	Own.	3.85	
3385	3185	3185	4685f	4685f	4385	136	32x4½	Marmion.....34	Own.	6-3½x5½	33.75	Strom.	Deleo.	Deleo.	m-d Own.	Own.	m Spicer.	¾F	Own.	4.10	
885	885		975b	985	1235	109	31x4	Maxwell.....	Own.	4-3½x4½	21.03	Stewart.	Remy.	Remy.	e Own.	Own.	f Own.	½F	Own.	4.60	
5400	4550g	5700	5000c	6720	6810	140	33x5	McFarlan.....1923	Own.	6-4½x6	48.60	Rayfield.	West.	West.	m-d M&E.	B-L.	m Peters.	F	Tim.	3.75	
3950b	3950c	3950c	3950c	4700	5000	132	32x4½	Mercur.....Series 5	Own.	4-3½x6½	22.50	Ball&B.	West.	Eisem.	m-d Own.	Own.	m Spicer.	F	Own.	3.87	
1695	1695	1850c	2050c	2275		119	32x4	Mercur.....6	Own.	6-3½x5	33.75	Strom.	West.	Eisem.	m-d Own.	Own.	m Spicer.	¾F	Own.	3.77	
1590	1590	1690	1850c	2050c	2275	120	32x4	Merit.....	Cont.	6-3½x4½	27.34	Strom.	Deleo.	Deleo.	s-p B&B.	Muncie.	f Sneed.	F	Col.	4.60	
	1395	1595d	1685c	1785	1935p	127	32x4½	Mitchell.....F-50	Own.	6-3½x5	29.40	Strom.	Remy.	Remy.	s-p B&B.	Own.	m Own.	F	Own.	4.42	
				1785	1935p	115	31x4	Mitchell.....F-50	Own.	6-3½x5	29.40	Strom.	Remy.	Remy.	s-p B&B.	Own.	m Own.	F	Own.	4.42	
				1785	1935p	115	31x4	Moon.....6-40	Cont.	6-3½x4½	23.44	Strom.	Deleo.	Deleo.	s-p B&B.	Warner.	m Spicer.	½F	Tim.	5.10	
				2085	2585	128	32x4½	Moon.....6-58	Cont.	6-3½x4½	27.34	Strom.	Deleo.	Deleo.	s-p B&B.	B-L.	m Spicer.	½F	Tim.	5.00	
1240	1240	1390	1645c	2090	2190	121	33x4	Nash.....691-3-6-7	Own.	6-3½x5	25.35	Marvel.	Deleo.	Deleo.	s-p B&B.	Own.	m Own.	½F	Own.	4.50	
915	935	1193d	1445	1275	112	33x4		Nash.....692-4-5	Own.	6-3½x5	25.35	Marvel.	Deleo.	Deleo.	s-p B&B.	Own.	m Own.	½F	Own.	4.50	
				1275	112	33x4		Nash.....41-8	Own.	4-3½x5	18.23	Marvel.	Deleo.	Deleo.	s-p B&B.	Own.	m Own.	½F	Own.	4.88	
9175	2475c	2485d	3250	3275	3285	130	32x4½	National.....BB	Own.	6-3½x5½	29.40	Rayfield.	West.	Deleo.	s-p B&B.	B-L.	m Universal.	F	Col.	4.08	
2500	2500c	2600c	1165f	1185	1545	128	33x5	Noma.....4C	Cont.	6-3½x4½	27.34	Zenith.	Deleo.	Deleo.	s-p B&B.	Detroit.	m Spicer.	½F	Tim.	4.45	
975	995	795g	1145a	1445	115	32x4		Oakland.....6-44	Own.	6-2½x4½	18.99	Marvel.	Remy.	Remy.	e Own.	Muncie.	m Mech.	½F	Own.	1.66	
975	975	1075c	1475	1595	115	32x4		Oldsmobile.....43 A	Own.	4-3½x5½	21.86	Zenith.	Deleo.	Deleo.	s-p B&B.	Muncie.	m Own.	¾F	Own.	1.70	
	1850c	1735	1675c	1875	2025	122	33x4½	Oldsmobile.....46	Own.	8-27½x4½	26.45	Ball&B.	Deleo.	Deleo.	e Own.	Muncie.	m Spicer.	F	Own.	1.53	
1625p	1375	1675c	1875	2025	115	32x4		Oldsmobile.....47	Own.	8-27½x4½	26.45	Johnson.	Deleo.	Deleo.	s-p B&B.	Muncie.	m Own.	½F	Own.	5.10	
825	825	425c	795	869	100	30x3½		Overland.....91	Own.	4-3½x4	18.23	Till.	A-L.	A-L.	s-p B&B.	Own.	m Own.	½F	Own.	1.50	
2485	2485	2250g	2630c	3175c	3275	126	33x4½	Overland.....92	Own.	4-3½x4	19.60	Till.	A-L.	A-L.	s-p B&B.	Own.	m Own.	½F	Own.	1.50	
				3325f	3350d	106	33x4½	Packard.....126	Own.	6-3½x5	27.34	Own.	A-K.	Deleo.	m-d Own.	Own.	m Spicer.	½F	Own.	1.66	
	2350g	2685		3525	3575	133	33x4½	Packard.....133	Own.	6-3½x5	27.34	Own.	A-K.	Deleo.	m-d Own.	Own.	m Spicer.	½F	Own.	1.66	
3850	3850	3850	5240	5400	136	35x5		Packard.....335	Own.	12-3x 5	43.20	Own.	Bijur.	Deleo.	m-d Own.	Own.	m Spicer.	½F	Own.	1.38	
2695	2450	2450	3235	3235	131	33x4½		Paige.....6-70	Cont.	6-3½x5	33.75	Rayfield.	Remy.	A-K.	m-d Long.	Warner.	m Mech.	½F	Tim.	4.60	
1550	1390	1425	2295d	2395	120	32x4½		Paterson.....23-6-52	Cont.	6-3½x4½	27.34	Strom.	Deleo.	Deleo.	s-p B&B.	Durston.	m Hartford.	½F	Salis.	1.60	
3300	2990	2990	3300	3400	128	33x5		Peerless.....23	Own.	8-3½x5	33.80	Ball&B.	Deleo.	Deleo.	m-d Own.	Own.	m Spicer.	½F	Tim.	1.90	
5250	5250	5250	6900	7000f	138	33x5		Pierce-Arrow.....	Own.	6-4 x5½	38.40	Own.	Deleo.	Deleo.	m-d Own.	Own.	m Spicer.	½F	Own.	1.29	
	1695	1745	1745	2445	2495	126	32x4½	Pilot.....6-50	H-S.	6-3½x5	25.35	Till.	Bijur.	Conn.	s-p Hoosier.	Muncie.	m Hartford.	½F	Col.	1.33	
3150	3100	3250	3300c	4300f	5100	126½	32x4½	Premier.....6-D	Own.	6-3½x5½	27.34	Johnson.	Deleo.	Deleo.	s-p B&B.	Own.	m Spicer.	½F	Own.	4.88	
1095	1095			1750	1825	117	32x4	Premcar.....6-40-A	Falls.	6-3½x4½	23.44	Strom.	Wagner	Wagner	s-p B&B.	Mech.	m Spicer.	¾F	Own.	5.06	
2485		2485	2585d	3350	3550	128	32x4	Princeton.....	Anst.	6-3½x5½	27.34	Rayfield.	A-L.	A-L.	m-d Own.	Own.	m Spicer.	½F	Own.	5.12	
	1665		2385c	2475	116	32x4		Princeton.....	Anst.	6-3½x5½	27.34	Rayfield.	A-L.	A-L.	m-d Own.	Own.	m Spicer.	½F	Own.	5.12	
	2850	2900	2850c	3500	3700	124	32x4½	R & V Knight.....R	Own.	6-3½x5	22.50	Strom.	Wag.	Wag.	s-p B&B.	B-L.	m Spicer.	½F	Salis.	1.75	
	1615	1485	1715	1855c	2436d	120	32x4	R & V Knight.....H	Own.	6-3½x4½	29.40	Strom.	A-L.	A-L.	s-p B-L.	B-L.	m Spicer.	½F	Tim.	5.40	
				2185f	2436d	120	32x4	Reo.....T6	Own.	6-3½x5	24.34	Rayfield.	N.E.	N.E.	m-d Own.	Own.	m f Own.	½F	Own.	1.70	
	1485		1855c	1855d	117	32x4		Rickenbacker.....B	Own.	6-3½x4½	23.44	Strom.	Bosch.	Bosch.	s-p Own.	Warner.	m Mechanics.	¾F	Col.	4.63	
2685	2485	2635	2750c	3285	3585	128	32x4½	Roamer.....6-54-E	Cont.	6-3½x5½	29.40	Strom.	West.	Split.	s-p B&B.	G-L.	f Sneed.	½F	Tim.	1.60	
	3685p	3485	3800	4250p	3950	138	32x4½	Roamer.....6-54-E	Cont.	6-3½x5½	29.40	Strom.	West.	Split.	s-p B&B.	G-L.	f Sneed.	½F	Tim.	1.60	
3785				4650p	128	32x4½		Roamer.....4-75-E	Roach.	4-4½x6	28.90	Strom.	West.	Split.	m-d B-L.	B-L.	f Sneed.	½F	Tim.	4.08	
10900	10900	10950		12800	12850	143½	33x5	Rolls-Royce.....40-50	Own.	6-4½x4½	48.60	Own.	Bijur.	Bosch.	e Own.	Own.	m Own.	F	Own.	3.28	
				13500	12900	118	32x4	Rubay.....	Own.	4-2½x5½	12.10	Strom.	Bosch.	Bosch.	s-p Own.	Own.	m Universal.	F	Own.	5.13	
1615	1615		2615d	2615	118	33x4		Sayers Six.....DP	Cont.	6-3½x4½	27.34	Strom.	Deleo.	Deleo.	s-p B&B.	(G-J.	m Arvac.	½F	Eaton.	1.75	
875	875			3500	3400	108	30x3½	Seneca.....L-2 & O-2	Lye.	4-3½x5	19.60	Zenith.	A-L.	A-L.	s-p B&B.	(G-L.	m Universal.	F	Peru.	4.50	
985	985			3500	3400	112	31x4	Seneca.....50c & 51c	Lye.	4-3½x5	21.03	Zenith.	A-L.	A-L.	s-p B&B.	(G-L.	m Universal.	F	Peru.	4.50	
		2500	2500c	3600	3500	127	34x4½	Standard.....99	Own.	8-3½x5	33.80	Zenith.	West.	Split.	s-p B&B.	G-L.	m Arvac.	½F	Tim.	4.45	
2750	2750	2750	2425g	3585	3985	130	32x4½	Stanley.....740	Own.	2-4 x5	None.	Bijur.	None.	None.	None.	None.	None.	½F	Own.	1.50	
319	343c	285g	530	645	102	30x3½		Star.....	Cont.	4-3½x4½	15.63	Till.	A-L.	A-L.	s-p Own.	Warner.	m Spicer.	½F	Tim.	4.87	
2250	2250	2150	2275c	3150	3450	125	31x4½	Stearns-Knight.....SKL-4	Own.	4-3½x5½	22.50	Rayfield.	West.	A-K.	m-d Own.	Own.	f Climax.	½F	Own.	1.50	
2700	2700	2850	2700c	3500	4500f	130	34x4½	Stearns-Knight.....6	Own.	6-3½x5	27.34	Rayfield.	West.	A-K.	m-d Own.	Own.	f Climax.	½F	Own.	1.70	
	1845	1295	1965c	1595d	1895	117	32x4	Stephens.....10	Own.	6-3½x4½	25.35	Strom.	Deleo.	Deleo.	s-p B&B.	Mech.	m Mech.	½F	Tim.	4.66	
	1985	1685	2085c		2385	124	33x4½	Stephens.....20	Own.	6-3½x4½	25.35	Strom.	Deleo.	Deleo.	s-p B&B.						



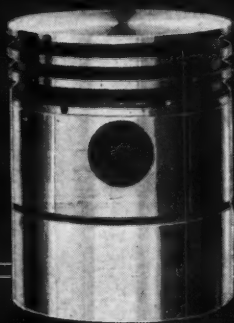
Rigid Inspection

Built of special lightweight castings, Spencer-Smith Pistons are rigidly inspected after each operation and finally one-hundred per cent reinspected, after they are completely machined, with amplifying gauges registering in one-tenth of one-thousandth of an inch.

SPENCER-SMITH MACHINE COMPANY
HOWELL, MICHIGAN

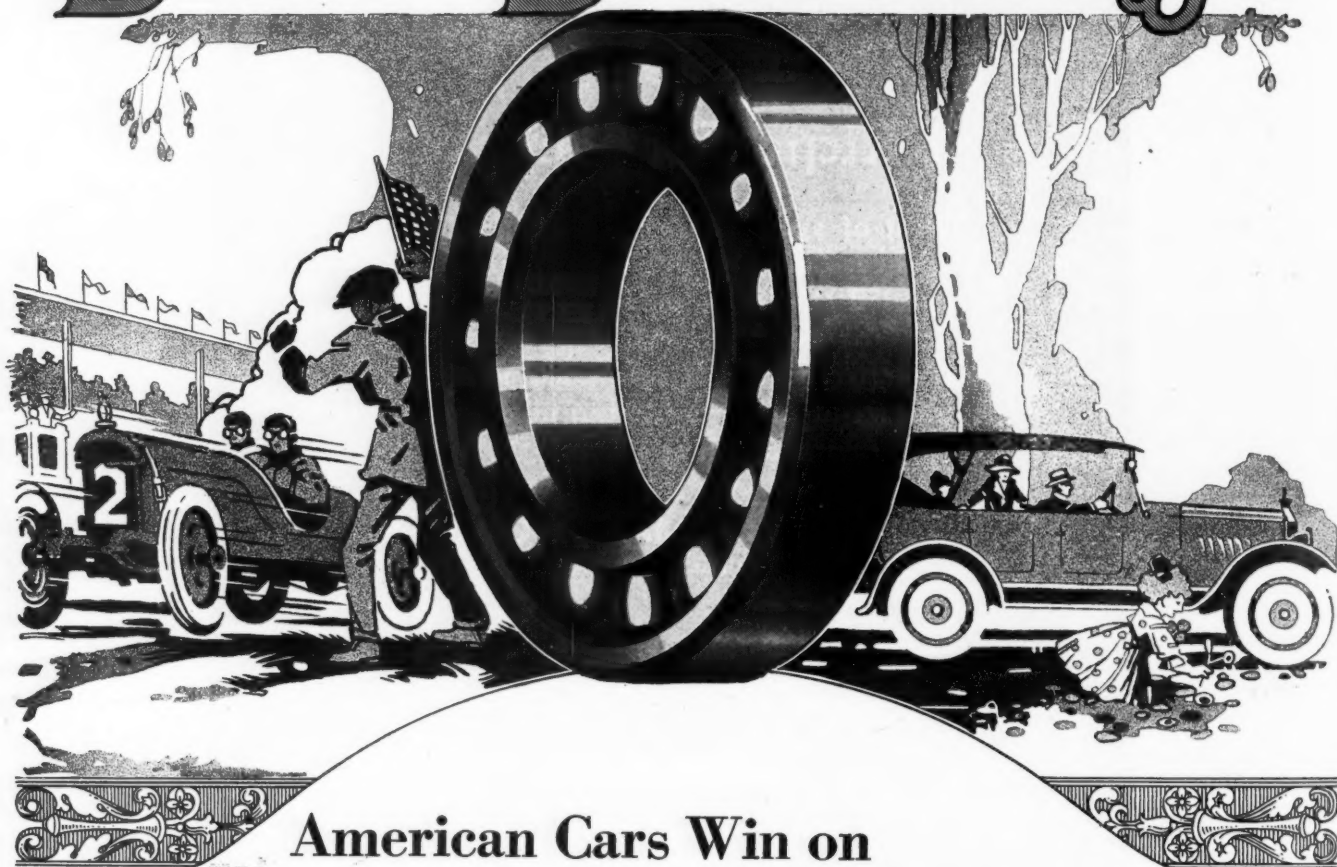
Largest Manufacturers of Pistons Exclusively

25



SPENCER-SMITH PISTONS

New Departure Ball Bearings



American Cars Win on American Ball Bearings

A GREAT majority of the cars in the Indianapolis race were equipped with New Departure Ball Bearings throughout,—in the front and rear wheels, differential, pinion, transmission, clutch pilot and throwout, motor crank, timing gear, valves, valve gear, distributor, camshaft, propeller shaft and generator,—full-jeweled New Departure Ball Bearing equipment.

All New Departure equipped cars finished without bearing trouble of any kind.

The bearings in these cars were in no sense "special" and indicate the confidence racing drivers have in New Departures for enduring efficiency even in severest possible service.

The New Departure Manufacturing Company,
BRISTOL, CONNECTICUT

Detroit—London, England—Chicago



Travel the Ladder With Your Prospects

The price the average motor car buyer pays for a car is governed by his earning power. Keep pace with him as he mounts the ladder of income. If he's only a few rungs up, sell him an Elcar Four at \$995. And keep on selling him Elcars as he goes on up—you can do it because the Elcar line has a wide price range and only one quality—the best.

When you sell a man an Elcar Four with five bearing Lycoming motor you make a profit and a friend, and you'll lose neither when you sell him an Elcar Six with 8-R Continental Red Seal Motor. Start on your way to bigger profits today—write or wire for the Elcar dealer's proposition.

ELCAR MOTOR COMPANY, Elkhart, Indiana

Builders of Fine Vehicles Since 1873

Fours, \$995 to \$1425

Sixes, \$1395 to \$1995

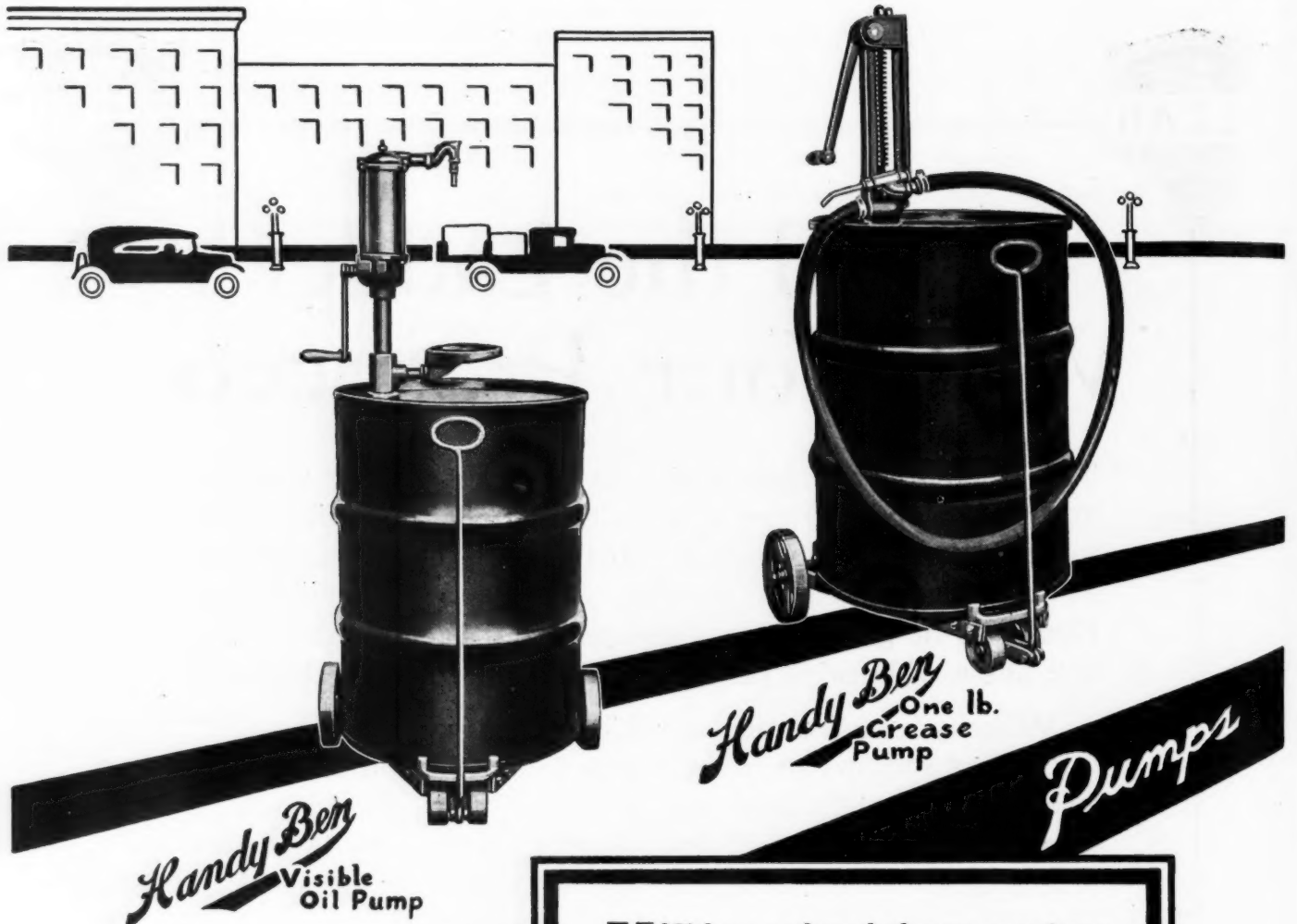
[f. o. b. Elkhart, Indiana]



Six Cylinder Sport, Price \$1595
[f. o. b. Elkhart, Indiana]

ELCAR

A WELL BUILT CAR



Handy Ben

Fill in name of your oil or accessory jobber below. Enclose check or money order. 30 days' trial.

SPECIAL TRIAL OFFER

Model 8 Visible Oil Pump—(Price \$14.75 each)
Truck \$6.50 extra
Model 6 Grease Pump—(Price \$12.75 each)
Truck \$6.50 extra

Ship to.....

Address.....

City.....

State.....

Jobber's name.....

City.....

State.....

YOU have perhaps had some experience with Grease and Oil Pumps. But unless you already possess one of my Handy-Ben Visible Oil and Handy-Ben One-Pound Grease Pumps, a real surprise is in store for you.

A surprise that will mean better service to your customers and increased bank deposits. My Handy-Ben Visible Oil Pump dispenses one quart per stroke. My Handy-Ben One-Pound Grease Pump accurately measures one pound per stroke. Both will pay for themselves within a few weeks' time. Both become portable Pumps by simply equipping them with my Handy-Ben Truck which operates with remarkable ease.

Once installed, you will wonder how you ever got along without these money-makers.

I sincerely believe each and every Jobber, Garage and Service Station in the country should use and recommend Handy-Ben Pumps on sheer merit.

Place your trial order today.

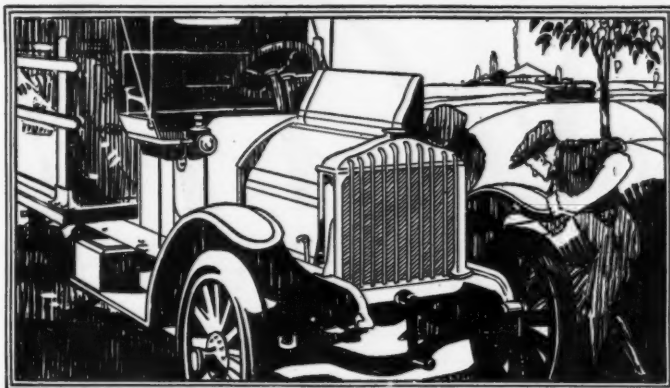


Ben Bennett
PRESIDENT
BENNETT INJECTOR CO.

Inventors and Manufacturers of Grease and Oil-Handling Devices

MUSKEGON, MICHIGAN

A File for Every Purpose



Every File Needed

---To Make
---To Repair
---To Maintain
a Motor Car or Truck

NICHOLSON FILES, made from first quality steel, scientifically heat-treated to retain an exact degree of hardness and keenness of edge---meet every filing need about a motor car or truck.

Whether for fitting bearings, filing babbits, reaming a hole---on down to such work as roughing a patch on a tire---there's a *right* NICHOLSON File for the job. A file that will assure quicker and better results, with less effort.

The NICHOLSON Tungsten Point File is the *only* file that cuts the super-hard metals in automotive electrical systems. The NICHOLSON Superior Platinum Point File is a file of fineness and delicacy that permits cleaning the plugs with minimum wear on the points.

Be sure the name NICHOLSON is
on the tang of every File in your shop

NICHOLSON FILE CO.

PROVIDENCE, R.I., U.S.A.

Warford

AUXILIARY TRANSMISSION

The Warford Transmission is attached in a few hours with no change in the Ford design or engineering



Full 2-tons on board, or hardly any practical limit with trailers—

The low-priced, high grade, economical Ford truck will do it easily, when equipped with Warford Auxiliary Transmission. No truck built has a better transmission. Puts six speeds forward in the Ford; gives brute pull that can't be stopped by any grade, load or road. Gives intermediate speeds that let the Ford engine PLAY ordinarily. Gives OVERSPEED for fastest, easy, economical hauling on pavement. Makes the empty return run economical!

The savings in operation pay for Warford over and over—and think of the extra earnings of a 2-TON Ford! Thousands of owners KNOW.

**Write for sure, sane, dealer proposition.
Puts Ford dealers into the big 2-ton market.**

The Warford Corporation, 44 Whitehall St., New York



It Pays Big to be a Kant-Skore SPECIALIST

The ever increasing number of cars in your community that need new pistons, offers you an opportunity which should not be overlooked. You can bring this profitable replacement business into your shop by specializing in Kant-Skore Piston replacements. As a Kant-Skore Specialist you are in a position to give your trade such piston replacement service as has never before been equaled.

With the installation of a set of Kant-Skore Light-Weight Close-Fitting Alloy Pistons, you magically convert the limping oil pumper into a powerful, pepful engine that will take the steepest grade on high; that will replace annoying motor vibration with a steady rhythmic purr; that will be miserly of gas and oil consumption.

The Kant-Skore is the only piston that successfully combines ALL the requirements that a replacement piston should have. To light-weight and close-fit — outstanding Kant-Skore features — are added strength of structure, durability, rapid heat dissipation and precision of manufacture. The Patented Spiral Slot makes these qualities possible.

Be a Kant-Skore Specialist; install the Light-Weight Close-Fitting Piston. Satisfied customers and substantial profits naturally follow.

Buy from a Kant-Skore distributor. There's one near you, prepared to give instant service.

Mail without fail today the coupon for your copy of our big 32 page Directory for 1923. It lists all the Passenger Cars, Trucks, Tractors and Motorcycles, together with complete specifications of pistons used.

THE KANT-SKORE PISTON CO.

2942 Spring Grove Ave. Cincinnati, Ohio

Kant-Skore

PISTONS

WEIGH LIGHTEST · FIT TIGHTEST



THE KANT-SKORE PISTON CO.

2942 Spring Grove Ave.,
Cincinnati, Ohio.

Please send me a copy of your new 32 page 1923 Directory, name and address of your nearest distributor and complete facts about the liberal Kant-Skore proposition. I am a

☐ Dealer ☐ Repairman ☐ Regrinder

Name.....

Street No.....

City..... State.....

M.A. 6-14-23



Sell a "6" -

and "Known Mileage!"

Sell a car you can make money selling! Sell a "six" that enjoys wide popularity because of its great dollar-for-dollar value! A "six" that costs less than many "fours"! Sell a moderate priced car appealing to a tremendous market—yet a quality-built car that will build a permanent business and lasting good will! A car that carries an exclusive, written, 15,000 mile engine guarantee! Sell a car that you can deliver to the owner with a definite assurance of "known mileage"! Sell a car built and backed by a responsible organization—a permanent division of General Motors! Get the benefit of Oakland's liberal financing helps in selling cars.

Oakland Motor Car Company, Pontiac, Michigan

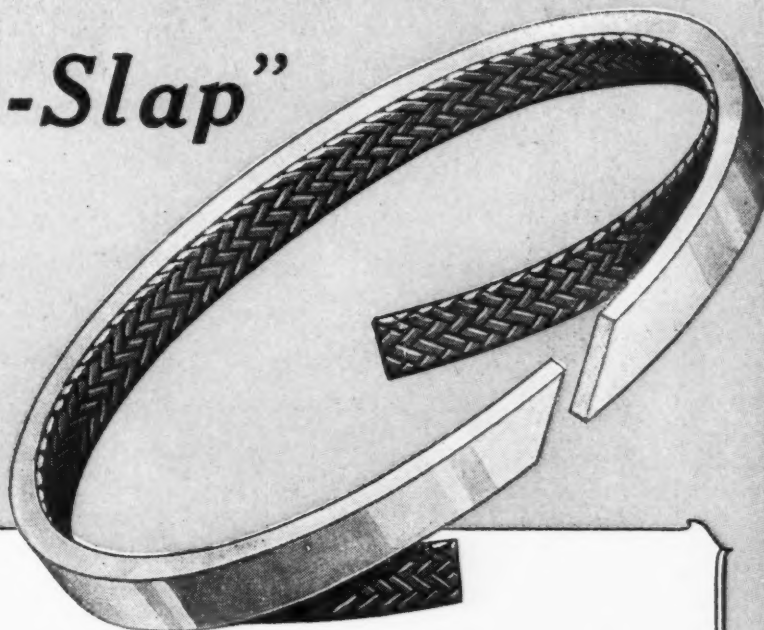
Division of General Motors Corporation

Oakland "6"

RINGPAK

REG. U. S. PAT. OFF.

Corrects These Troubles *Poor Compression "Ring-Slap"* *Oil Pumping Carbonization* *"Piston-Slap"*



MOST motor troubles originate from leakage of gas around and under the rings into the crank case where it dilutes the oil. See illustration above. Gasoline will not pass a piston sealed with RINGPAK. The

shaded portion of illustration shows how effectively RINGPAK packs the groove, taking up the clearance.

RINGPAK is put up in strips contained in cans, each strip sufficient to pack one groove. 1 Doz. cans in handsome display container.

Can of 12 strips, $\frac{3}{16}$ " ... \$4.00

Can of 18 strips, $\frac{3}{16}$ " ... 6.00

Can of 12 strips, $\frac{1}{4}$ "
(For Ford) 4.00

Special sizes and packages for wider or narrower rings and pistons of larger diameter.

RINGPAK (Patent applied for) is a strip of lubricated asbestos textile, substantially reinforced, which packs the space between ring and groove, and holds the ring against the cylinder wall. The principle is as simple as it is effective. Any car regains lost power and takes on new life when RINGPAK is used. RINGPAK is a practical, scientific solution of many engine troubles. You will find the sale and installation of RINGPAK profitable. Put it in stock. Every owner a prospective customer. Send for particulars.

FREE SETS TO SERVICEMEN

To prove the merits of RINGPAK we will furnish *without charge*, a set of RINGPAK for a Ford engine, to the first hundred servicemen answering this advertisement.



Solid Weave - More Asbestos Assures Quality

GARCO is *all* brake lining. The solid weave combined with a greater quantity of asbestos puts GARCO on a plane far above ordinary linings.

Add to this the fact that GARCO is built, from start to finish, by the *largest* manufacturers of asbestos textiles in America and you realize why GARCO has achieved its pre-eminent position.

Nationally advertised and sold by all jobbers, dealers and servicemen who take pride in their business, and the service they render.

GENERAL ASBESTOS & RUBBER COMPANY

Main Offices and Factories:

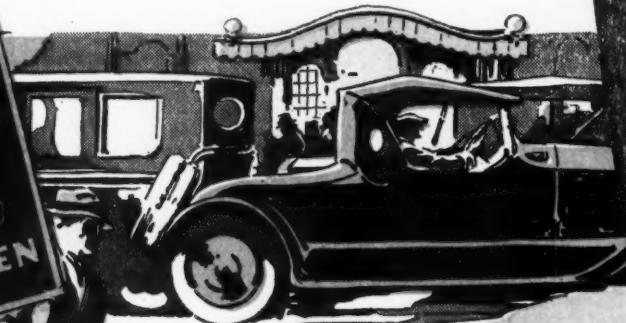
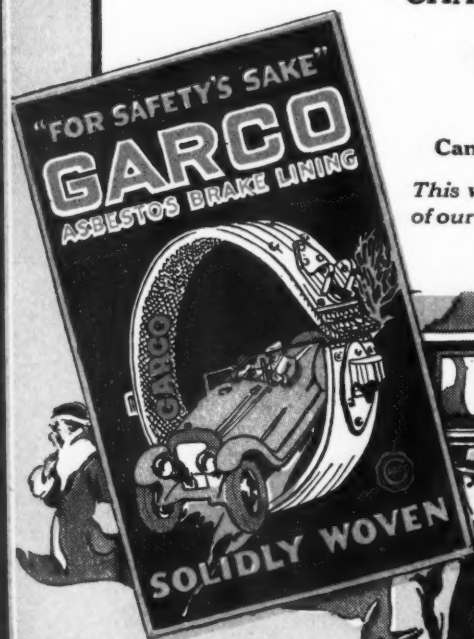
CHARLESTON, S. C.

New York: 296 Broadway
Chicago: 14 North Franklin St.
Pittsburgh: 311 Water St.

Canadian Distributors:

Canadian Asbestos Company, Montreal

*This wall hanger is one
of our many dealer helps*

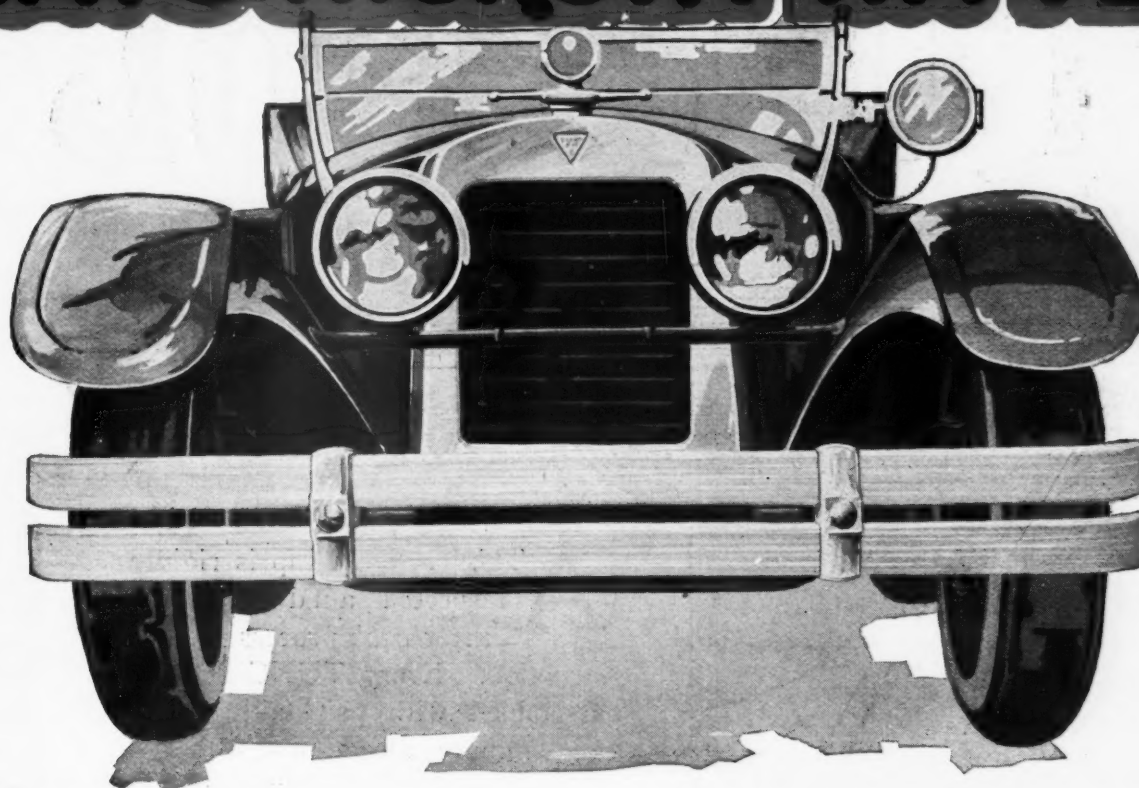


BRAKE LINING

GARCO

ASBESTOS

HAYS HICKORY HITTER



STANDING alone in the bumper field—the Hays Hickory Hitter absorbs comparison as it absorbs shocks.

Individual and distinctive as well as beautiful, and in perfect good taste on any car. Strong and massive—giving the utmost protection, yet weighing only about half as much as other types. Having the highest rating and carrying the maximum reduction in collision insurance rates with its use, yet selling for a surprisingly low price. Sold with the strongest guarantee imaginable—"a new bumper free if it breaks"—a guarantee which lasts for the life of your car.

For the past three years the Hays Hickory Hitter has been getting the acid test of actual usage—on all kinds of cars—in practically every state in the union; as well as passing the rigid tests of the Underwriters' Laboratories.

Every part, from the straight grained hickory bars to the

last nut and bolt, have been brought to perfection. The bumper bars are second-growth hickory—seasoned and steam-bent; tough and resilient as steel though weighing vastly less. The shape and temper of the crucible steel springs have been determined by exhaustive tests—their strength is enormous. They are clamped to the hickory bumper bars by massive polished brass castings—rustless and beautiful. There are fittings for every make and model of car—fittings which really fit, without rattling and without drilling any holes.

For forty-five years we have been manufacturing hardwood products wherein the strength of steel was necessary without steel's excessive weight. We have summed up the experience of these years in the Hays Hickory Hitter—the result being a bumper for which there is no standard of comparison—a bumper which compels the faith expressed by our guarantee—"for the life of your car."

We make two types of bumpers—double bar and single bar—both are made of the same high grade material and with the same expert workmanship—and both carry the same "for the life of your car" guarantee.

**Double Bar
Type**

\$18.00

**Weights
27 pounds**

DEALERS: *There is no bumper which you can handle with so much satisfaction and profit as the Hays Hickory Hitter. It makes friends for itself and for dealers wherever it goes. One Hays Hickory Hitter on the street means fifty more sales. Write for catalogue and the name of our jobber in your territory, also for our contract plan of sales to dealers.*

JOBBER: *Desirable territory is still open. Write for details.*

**Single Bar
Type**

\$12.50

**Weights
18 pounds**

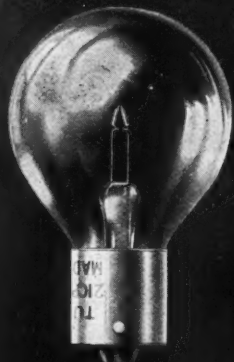
J. M. HAYS WOOD PRODUCTS CO.

Jefferson City, Mo.

A Division of The Standard Crate & Filler Co.

Guaranteed for life of your car

TUNG-SOL



A TUNG-SOL lamp is rigidly inspected and examined after *each* process in construction. Every TUNG-SOL is assembled with painstaking care and minute attention to detail. These are the factors which give to TUNG-SOL its reputation for uniform Quality and long life.

MINIATURE INCANDESCENT
LAMP CORPORATION
Newark, New Jersey

*Licensed Under General Electric
Company's Incandescent Lamp Patents*



"LET TUNG-SOL LIGHT THE WAY"

Does this letter state your case?

"We will say frankly that we are not especially interested in selling motor oil; selling cars keeps us busy.

"But we are interested in seeing to it that our Chandler and Cleveland owners get the very best possible service for their cars; and from their cars. And we know that requires proper lubrication.

"Therefore, we have been very careful to select the right lubricants to work properly in our cars; and Sunoco oils and greases meet our requirements. We have used them for over two years."

—From a Western car dealer.

Satisfied owners are your best salesmen. There's an easy profitable way to keep your car-owners satisfied: see to it that their cars are properly lubricated. Good oil helps you sell *more* cars; it keeps down your cost of servicing new cars; it makes the old ones run better. Talk lubrication—good oil and good grease.

Sunoco Motor Oil is wholly distilled in every type, pure and uniform. It increases power, decreases carbon and repair expense. And if you *are* interested in additional business, Sunoco will show you some increased profits.

Our booklet, "Making More Money out of Motor Oil" is well named. Better send for a copy; then read it.

SUN OIL COMPANY, Philadelphia

Sun Oil Company, Limited. Montreal

Branches and Agents in Principal Cities

SUNOCO
THE DISTILLED OIL





**Get This
Catalog**

The "RED BOOK" of the SPRING INDUSTRY

Our new catalogue of replacement springs is ready for distribution. It quotes rock-bottom prices.

QUALITY in American Springs is universally admitted. Now you can get these high-grade, perfect-fitting springs at prices that assure you a big volume of spring business.

Send the coupon for this book. Get more than your share of the replacement business in your territory.

**Use The
Coupon**

AMERICAN Springs

AMERICAN AUTOPARTS COMPANY

French Road

Detroit

Michigan



American Auto Parts Company
9775 French Road, Detroit, Michigan

Gentlemen:—Send me your new "rock-bottom prices" replacement spring catalogue.

BOWSER

New Life to the Old Pump

Put the hand-power POST Sentry beside your old hand pump (regardless of its name, size or pedigree) and at once you have a visible, measuring, accurate trade-getter. Easy to install—very little piping required, and none of it underground, if you now have a pump. Fast and absolutely accurate in operation.

Write for folder A-14 and make your
old pump get today's business

S.F. BOWSER & COMPANY, Inc.
Pump and Tank Headquarters

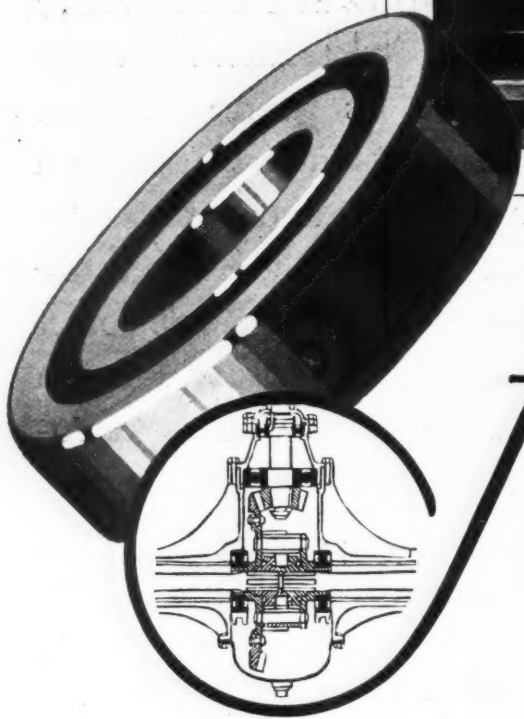
FORT WAYNE, INDIANA.

Sales and Service Offices and Representatives Everywhere



TANKS **DEPENDABLE** PUMPS





BEARINGS

for every application

Radio Thrust Bearings for wheels differentials pinion shafts and all other applications carried in stock at each of our 37 Branches. This is but one of the lines carried at our branches to give you PROMPT SERVICE.

BRANCHES

In thirty-seven cities!

**AHLBERG
BEARING
COMPANY**

321 East 29th St. Chicago



Approved by the Underwriters'
Laboratories, Inc.

Why You Should Supply the Growing Demand for the Johnson Spare Tire Lock

The Tire Lock That Says: "No" to the Thief, and Means It

- | | |
|--|--|
| 1. Indestructible cable—indestructible lock. | 6. Can't rattle. |
| 2. Can't be cut or smashed off. | 7. Fits all kinds of tire carriers. |
| 3. Keyhole cannot clog—has automatic closing device. | 8. Lowers insurance premiums. |
| 4. Lasts a lifetime. | 9. Backed by Johnson reputation for quality. |
| 5. Rust-proof—dust-proof—thrift-proof. | 10. Nationally advertised. |

Sell This Profitable Safe Guard for Spare Tires

The ten reasons for the large and growing demand for the Johnson Spare Tire Lock—its ten points of superiority—are the reasons why you should *sell* it. Through our National Advertising Campaign in The Saturday Evening Post, car owners are learning that tire thieves have at last been outdone.

It is built of heavy aircraft cable, armored with hardened steel beads that revolve freely and turn from under every blow. The lock itself, a specially hardened steel block, locks against the shoulder of any bead. Resists practically every form of malicious attack.

*Sold by all leading jobbers. If yours cannot
supply you write us at once.*

Address Department B

Johnson Automobile Lock Company

Makers of the famous Johnson Transmission Lock

St. Louis, U. S. A.

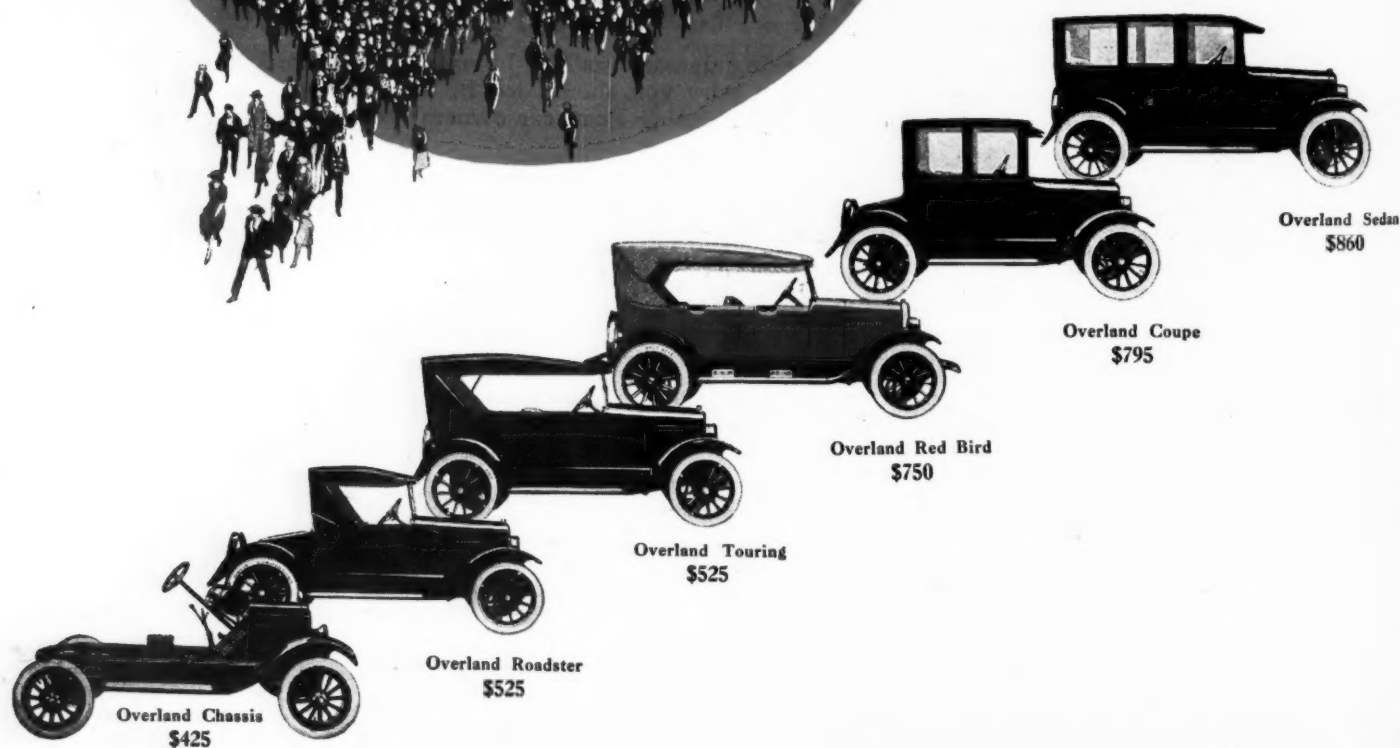
Johnson
SPARE TIRE LOCK

WILLYS-

Cars fill more than 90%

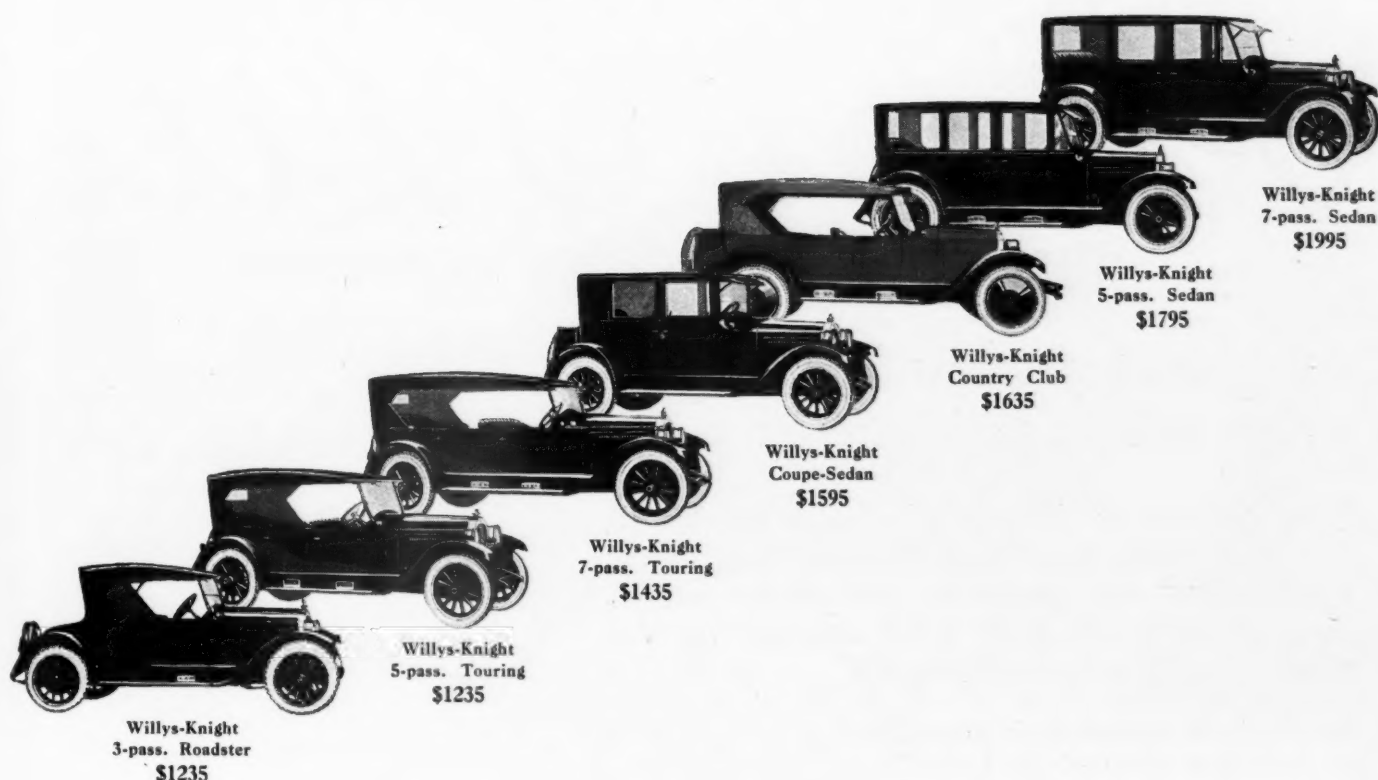


MORE than 90 per cent of all automobiles sold are within the range of prices and models provided by the Willys-Overland line.



OVERLAND

of all Automobile Needs



More than 90 per cent of all cars list under \$2,000. The Willys-Overland line covers this less-than-\$2000-market like a tent.

From the Overland Touring and Roadster at \$525 to the Willys-Knight 7-passenger Sedan at \$1995, the Willys-Overland merchant has a step-up of prices to suit the pocketbook of every purchaser in this vast field.

Further—he has a body type to satisfy every conceivable fancy and need of every man, woman and business concern.

Still further, he is able to graduate his owners of one price into purchasers of a higher price as time goes on—keep them in the family.

Added to this big opportunity, the Willys-Overland merchant has other powerful advantages.

He needs but one stock of parts to take care of the service needs of his customers.

He has the concentrated, unified, constant backing of one great national and local advertising campaign—complete and effectual.

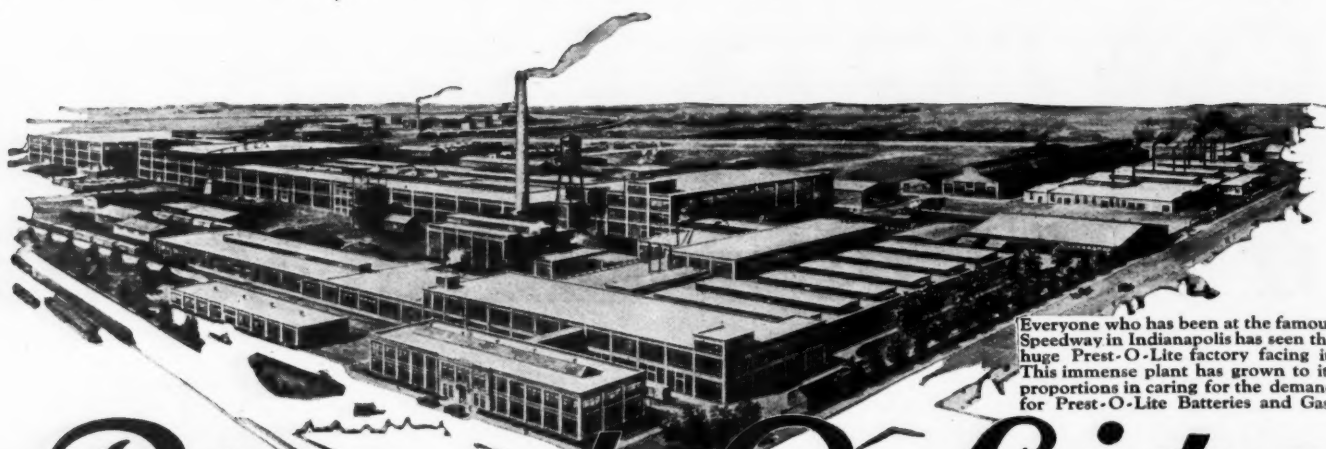
He has one factory policy to understand and cooperate with.

And he has one franchise—the fairest, we believe, in the industry.

With all this on their side, Willys-Overland merchants are gathering a rich harvest. This is the most bountiful year in Willys-Overland history. New applications are being made, and many accepted right along, to represent Willys-Overland.

If you have it in you to make a bigger success than you are making now, get in touch.

WILLYS-OVERLAND, INC.
TOLEDO, OHIO



Everyone who has been at the famous Speedway in Indianapolis has seen the huge Prest-O-Lite factory facing it. This immense plant has grown to its proportions in caring for the demand for Prest-O-Lite Batteries and Gas.

Prest-O-Lite

THE OLDEST SERVICE TO MOTORISTS

A growth from a beginning to millions of batteries

The success of Prest-O-Lite is made all the more impressive by the fact that it has established its position by sheer merit, against batteries that were already in the field when it was introduced.

In 1916, for instance, six automobile manufacturers in America adopted the Prest-O-Lite as equipment. In 1917 the number had grown to 19; in 1918 it was 29; in 1919 it was 40; in 1920, 49; in 1921, 58, in 1922 it was 77—and thus far in 1923, 85 of the leading cars are equipped with Prest-O-Lite when they are built.

In addition, thousands of motorists, knowing what the name of Prest-O-Lite means, have purchased Prest-O-Lite batteries for their cars as replacements, thus bringing the number that have been sold away up into the millions.

The backbone of a Prest-O-Lite Battery is Prest-O-Plates—the plates that are the long sought combination of the necessary hardness with ample porosity. They supply pep, power and unusual reserve strength. All other parts are on a par with them; that is why Prest-O-Lite is the best all-around, all-weather battery.

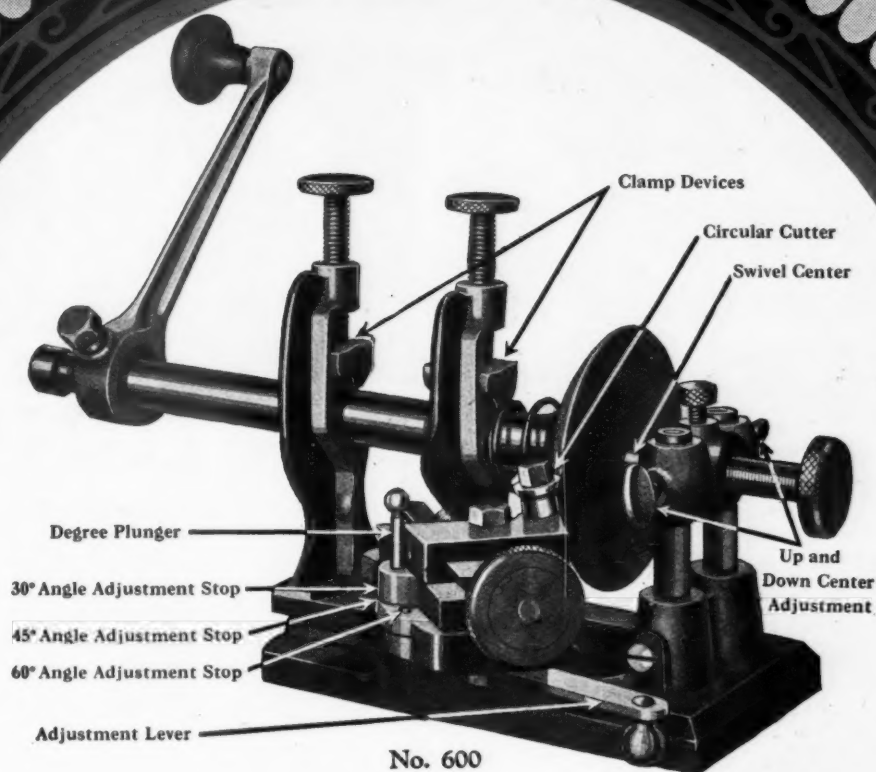
THE PREST-O-LITE COMPANY, Inc.
INDIANAPOLIS, IND.

New York Office: 30 East 42nd Street
Pacific Coast Office: 599 Eighth Street, San Francisco
In Canada: Prest-O-Lite Company of Canada, Ltd., Toronto

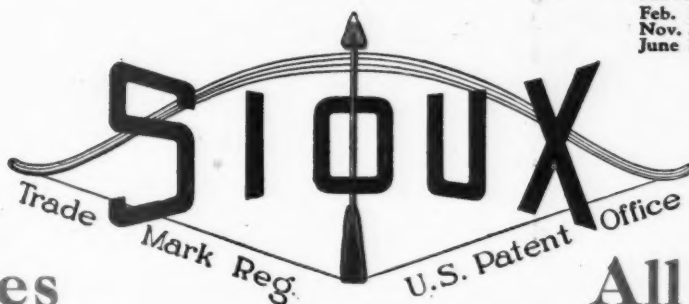
Be a more prosperous dealer

Battery stations, service garages, automobile dealers and others who are live merchandisers and interested in having a prosperous, permanent business, are invited to write us for our distributor proposition and plan.





PATENTED
Feb. 17, 1914
Nov. 26, 1918
June 22, 1922



Refaces

All Valves

Either 30, 45 or 60° angles and from 1 $\frac{3}{8}$ " to 4 $\frac{1}{2}$ " in diameter.

Whatever his requirement in size or degree, the user of a "Sioux" Valve Lathe always expects and always receives exceptionally fine performance.

Get acquainted with "Sioux" Tools. It's the right step toward shop economy.

Sold by All Live Jobbers

Write for Catalogue and Valve Seat Reamer Specifications
ALBERTSON & CO.

SIOUX CITY, IOWA

"The Well Equipped Shop Gets the Business"

SIOUX VALVE LATHE

The new **BO** **IGNITION** **FO**



What it does

- 1—Makes Easy Starting
- 2—Keeps Plugs Clean
- 3—Prevents "bucking"
- 4—Gives More Power
- 5—Saves Gas and Repair Bills
- 6—Stops Timer Troubles
- 7—Pays for Itself
- 8—Prevents Short Circuits
- 9—Cuts Down Vibration
- 10—Eliminates Spark Lever

Half of all the cars in your town are Fords!

Here's something their owners will buy quick—a wonderful new ignition system, built by the makers of the world-famous Bosch Magneto—and sold at only \$12.75.

Every Ford owner is a live prospect. Show them Type 600, explain what it does, and 1923 will be the most successful in the history of your business.

Every purchaser will continue to trade at your shop, and bring his friends in, too—

Type 600 Ignition System definitely improves Ford engines. It makes starting easy, adds power, saves gas and keeps the engine running smoothly at all speeds.

Ford Trade -

SCH

SYSTEM FOR

RDS

Don't miss this opportunity. Someone in your town is going to sell a lot of these systems this year. You can be the lucky one, and make 1923 a record breaker.

Time is precious. Wire for sales plan and a sample fitting, C.O.D.

This wonderful new system is guaranteed—you can't go wrong.

American Bosch Magneto Corp.

Main Office and Works:
SPRINGFIELD, MASS.

New York

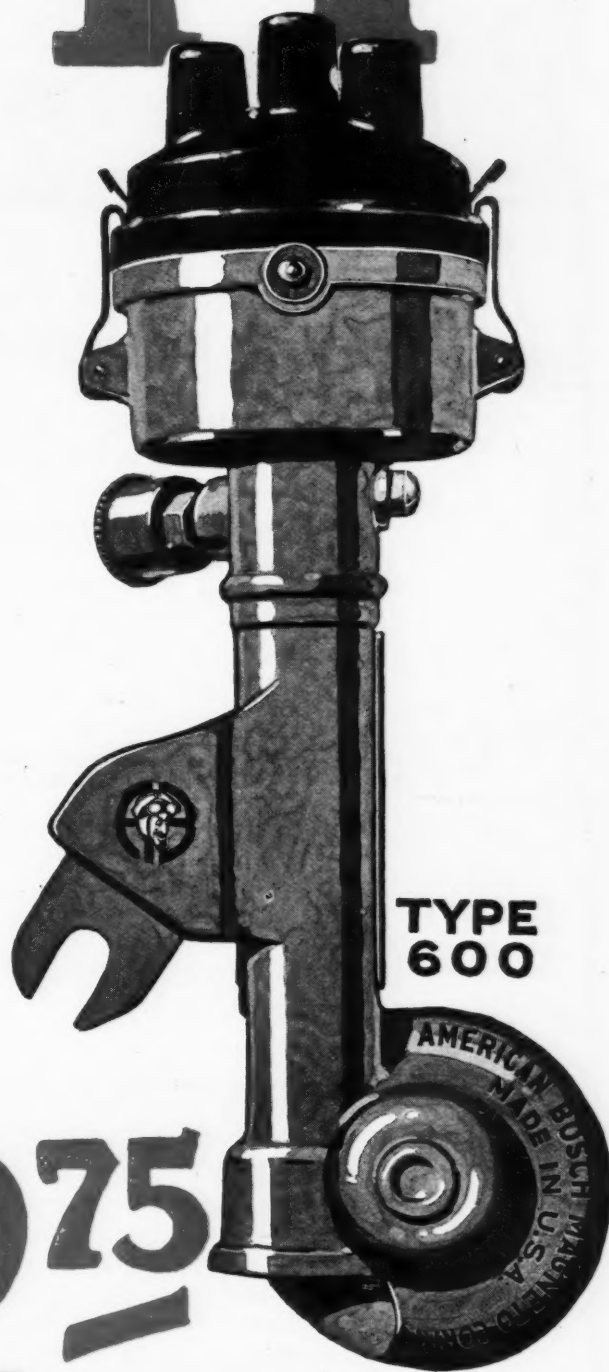
Chicago

Detroit

San Francisco

The Bosch De Luxe Ignition System, Type 513, is so designed that it becomes a definite part of the engine. This system, which includes the Bosch Coil and Compensating Governor, is made for battery equipped Fords of 1919 and later. It is remarkably efficient and dependable. Price, \$25.00 complete.

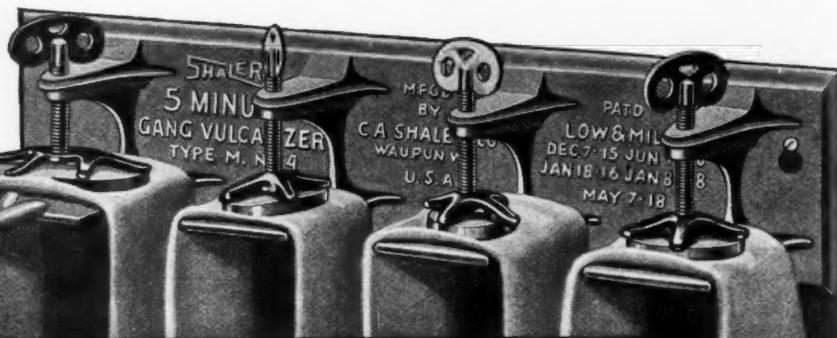
\$12⁷⁵
and tax





SHALER

M-4 Vulcanizer



How to Get One FREE!

For a limited time only—we will ship Absolutely Free with each Shaler M-4 Vulcanizer—28 assorted Patch-&Heat Units (12 Round, 12 Oblong and 4 Ex-Long.)

If you only average 35c each for tube repairs that bring 50c at most shops, these 28 Patches will bring in \$9.80—nearly \$3 more than the \$7 you pay for the Vulcanizer.

Vulcanizes 4 Punctures in 5 Minutes

Takes a space only 5 x 20 inches on the wall. Has four heavy clamps with big, easy-turning thumbscrews so that four tubes can be vulcanized as quickly as one. Far more

convenient for quantity repair work than the little clamps that motorists use. Can't be mislaid—always ready. Tubes being repaired are kept off the dirty floor or workbench.

Write Your Jobber NOW

Don't delay. Take advantage of this opportunity of getting this handy Shaler M-4 Vulcanizer—with Free Patches enough to pay for it. One day's work will pay for the outfit—and after that it will earn money for you every day.

Your jobber can supply you with special, large size packages of Shaler Patch-&Heat Units—for tire repair shop use—at prices so low that it is not only the best—but the cheapest method of making tube repairs. It saves time and pleases customers.

C. A. SHALER CO., 216 Fourth Street, Waupun, Wis.



Jacobs
Chucks

—Unless



A man can't do a machine's work at a machine's speed and with a machine's accuracy.

So a man can't make a machine's profits—unless he's got the machine.

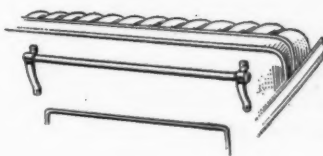
Proper equipment is as essential to success in the operation of a repair shop as is a place to do the work.

Putting On A Robe Rail

See that the chuck is a Jacobs before buying a portable electric drill.

Jacobs Chucks
Are

(CATALOGED)
in the Red Directory



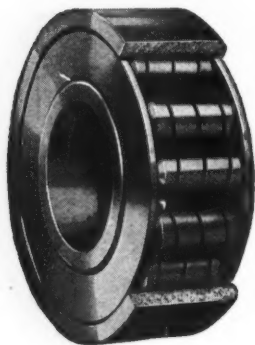
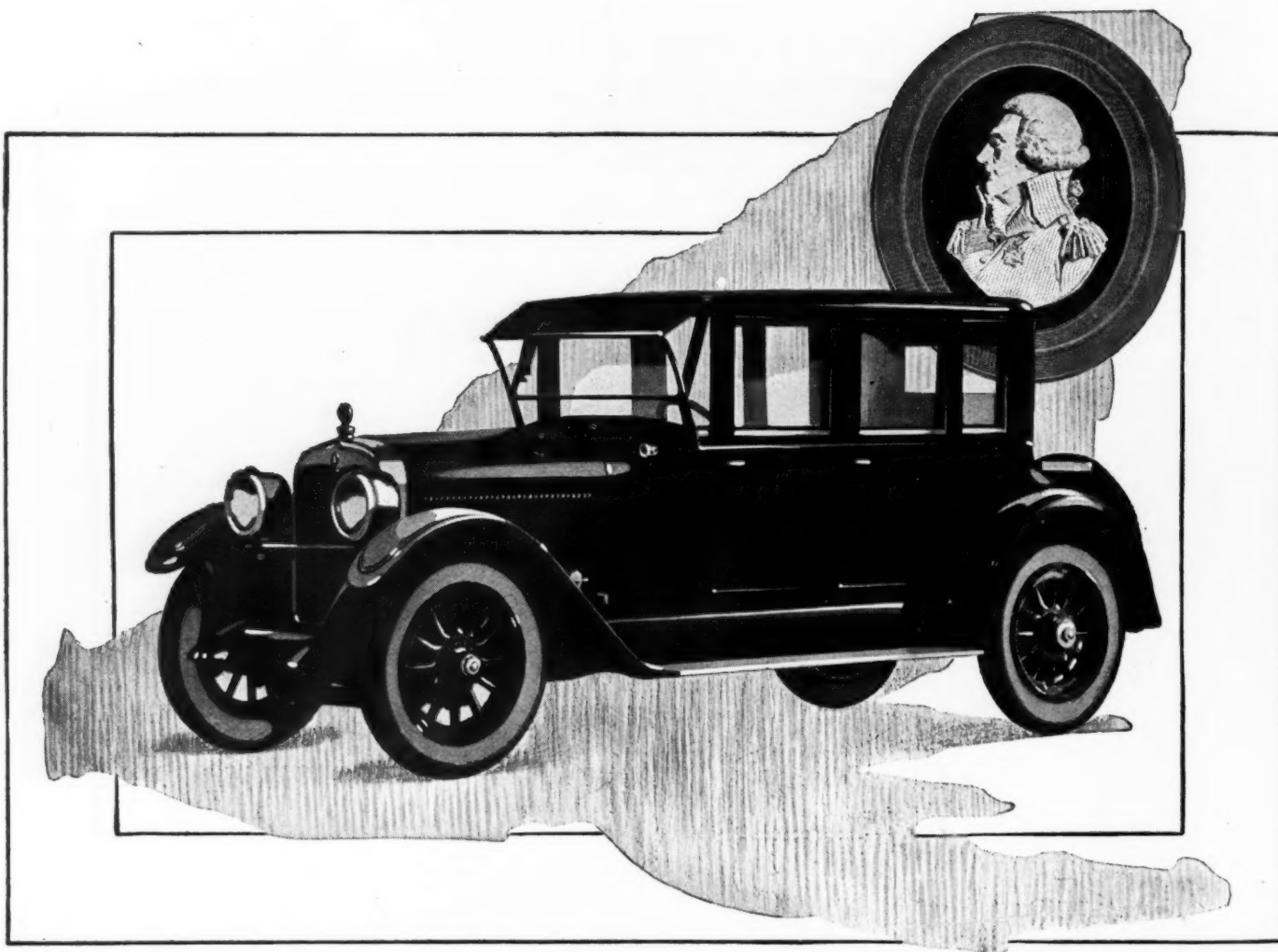
To make an awkward drilling job easy there's only one tool to think of — a portable electric drill. It's not only an effort saver, but a work speeder—and you're always sure of a clean job.

THE JACOBS MFG. COMPANY, HARTFORD, CONN.

This advertisement inserted in the interest of better Service Equipment in general and "the use of Portable Electric Drills in particular"

"Good Machine Tools Are Essential"





THE La Fayette provides an excellent example of what can be accomplished in fine automobile building where quality of materials and precision of workmanship are held to rigid standards.

Hyatt roller bearings have again demonstrated to a quality car manufacturer the desirable results that are assured through the use of these bearings.

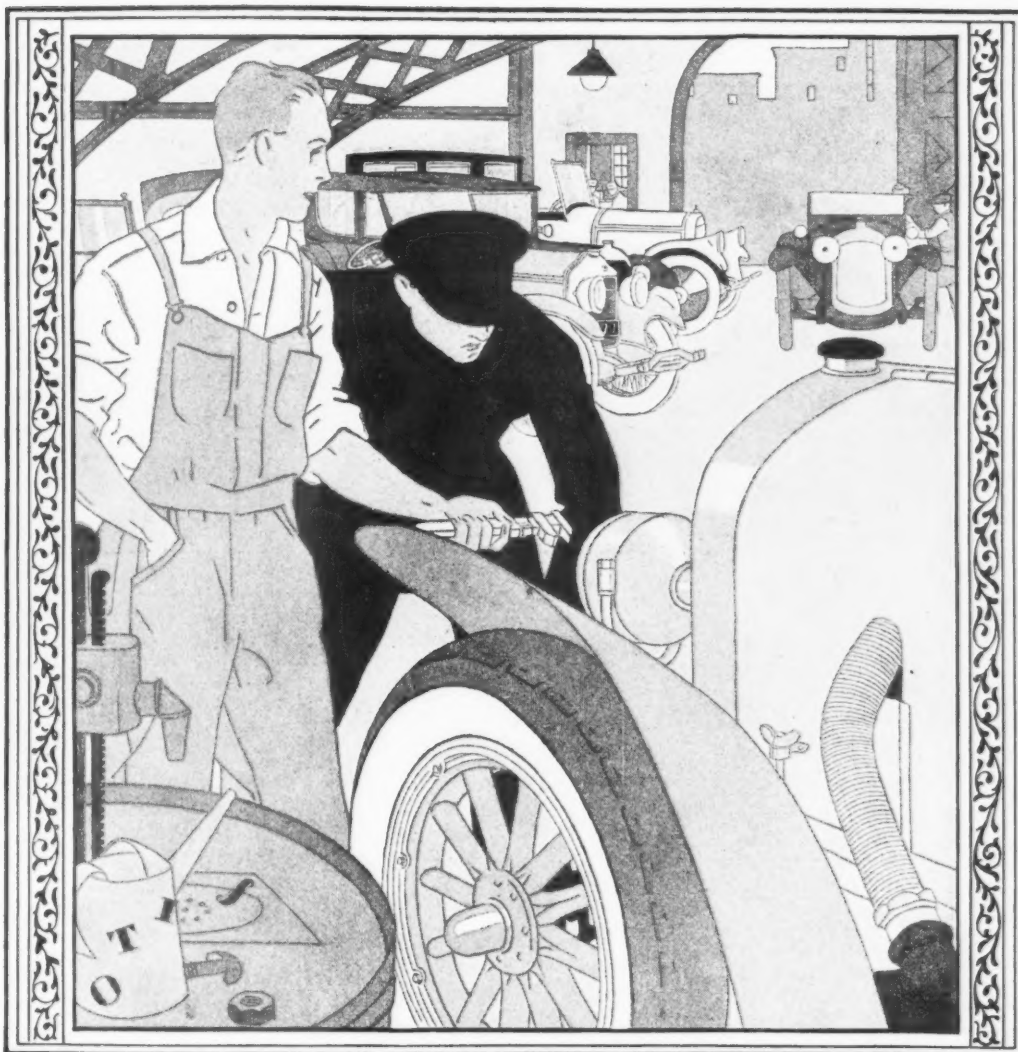
By building Hyatt bearings into the transmission an appreciable contribution has been made to the strength and quiet operation of the La Fayette car. They also help to give the driver that serenity of mind which comes of the knowledge that the mechanical construction of his car is dependable—always.

HYATT ROLLER BEARING COMPANY

Newark	Detroit	Chicago	San Francisco
Worcester	Milwaukee	Huntington, W. Va.	Minneapolis
	Cleveland	Pittsburgh	Indianapolis
		Buffalo	Philadelphia

HYATT

Quiet
Roller Bearings



"Fred! Here's *Another Stabilated Car*

"This fellow splashed in last night, mud from top to bottom. Said he left Weston yesterday morning and beat it all the way here through that storm. Yes, detours and all.

"How he ever got over those hill roads beats me, but he says he would go anywhere with Stabilators."

In a Stabilated car, you can motor where you please whether the roads are rough or smooth. You can drive with a totally new degree of comfort and safety, because Stabilators control spring recoil in proportion to the size of each road-bump or hole.

That is why fine cars are factory equipping with Stabilators and why owners everywhere are having their present cars Stabilated.



WATSON STABILATORS

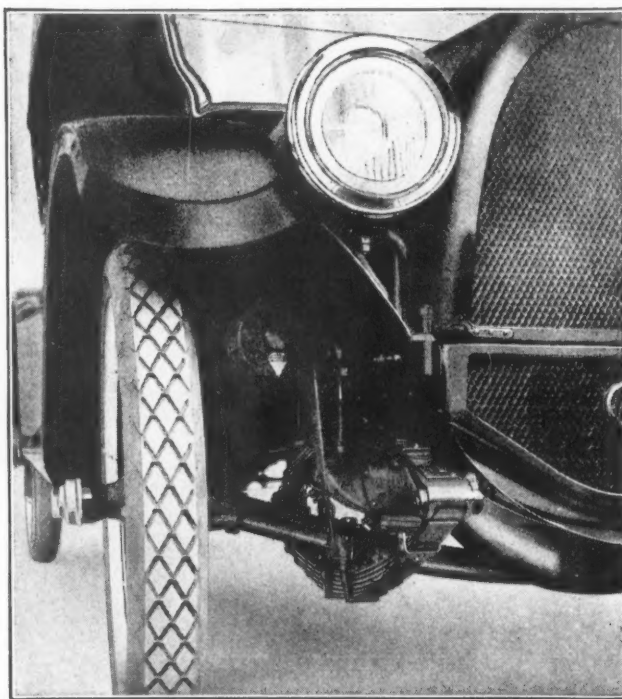
JOHN WARREN WATSON COMPANY, PHILADELPHIA

CHANGE THE WHOLE NATURE OF YOUR CAR

On the "FRANKLIN"

It is natural that the Franklin, always notable for its easy riding qualities, was one of the first to recognize the value of Stabilation.

If you want to know what real motoring comfort is, if you want to know the meaning of roadability, take a demonstration in the latest Franklin creation, the new "Series Ten"—Every new Franklin is Stabilated.



WATSON
STABILATORS

JOHN WARREN WATSON COMPANY, PHILADELPHIA

CHANGE THE WHOLE NATURE OF YOUR CAR

No Money in Back Numbers

HOW many clothing dealers are handling "peg-top pants" these days? You might find one or two out in the backwoods.

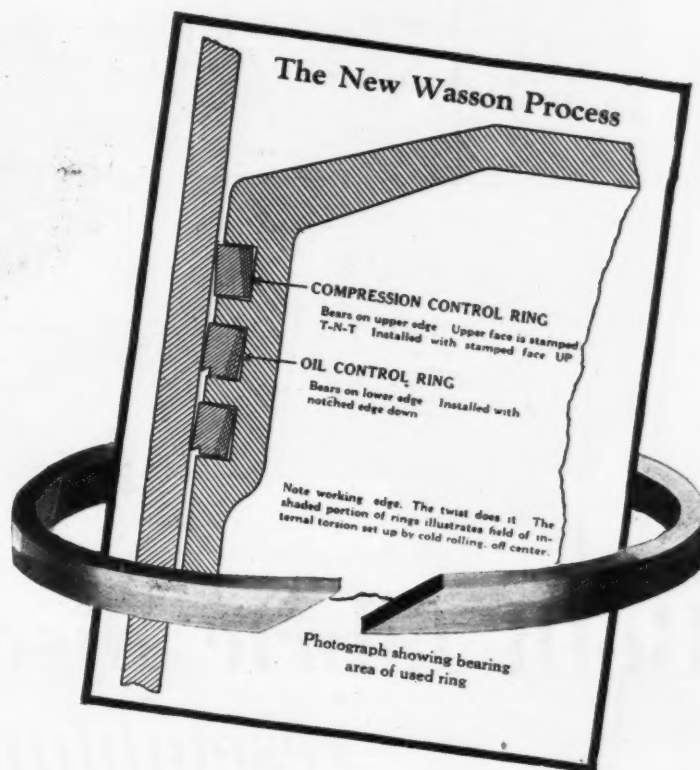
How many automobile dealers are featuring cars with "one-lung" engines? Not enough to recruit a one-man army.

For the simple truth is that you can't make money out of back numbers.

The old-style piston ring is one of these back numbers. You know it's bound to go. You know it cannot compete with the T-N-T piston ring which—

- gives on test 19% greater motor efficiency,
- saves 50% plus on oil,
- is 200% longer lived than any other ring equipment on the market today.

If that is true you know that the big money makers in the long run will be the dealers and distributors who start now with T-N-T.



A Sure-Thing Bet—Not many bets are sure. But backing T-N-T is as sure a thing as putting your money on Man-o'-War when the other entries are ex-plough horses. And that's not greatly exaggerating the difference in quality and service between T-N-T and the average piston ring.

Why T-N-T Rings are Better—The T-N-T Piston Ring is given a permanent internal twist by cold-rolling, forcing it to turn outward and present only one edge—instead of a flat surface—to the cylinder wall. This working edge—almost a line bearing—keeps compression up and oil down with only a thin film for lubrication. It is elastic and reaches out to find an immediate and permanent bearing. That means no "wearing in" of piston rings and wearing out of the cylinder wall.

Another point of T-N-T superiority. Instead of bearing hard on the cylinder wall at the joint and directly opposite the joint, the T-N-T ring exerts even pressure all the way around.

Clearly this saves wear and tear on the cylinder. Notice the illustration of the used ring. The bearing surface is uniform from point to point.

Under all kinds of shop and road tests, T-N-T Piston Rings exceed all known standards of efficiency. They absolutely guarantee at least 50% more mileage per gallon of oil on any car or truck. Here are some of the record-

breaking T-N-T increases in oil mileage,—specific cases, the records of which are available upon request:—Moon, 60%; Cadillac, 75%; Oakland, 200%; Chalmers, 300%. The Ford average is 1,200 miles per gallon.

From the profit point of view—All these T-N-T records and unique T-N-T features indicate just one thing to the hard-headed dealer and distributor—*increased profits*. For the man who sells the best sells the most.

You can sell the truck-fleet owner a cool 25% saving in his depreciation account. Do you think many business men are going to turn that down? You can sell the service and garage man a piston ring that means satisfied customers and jobs with no "come-backs," jobs to be proud of.

And you can sell the car-owner lower cost of operation and surprising motor efficiency. There isn't a man driving today who won't pay gladly for that.

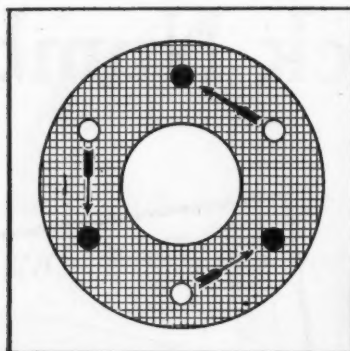
Remember—there are over 12,000,000 automobiles and trucks in America today. That's your field.

Blazing a New Trail—That's the title of our special sales-manual for Distributors and Dealers. It tells all about the big profit-possibilities of T-N-T Piston Rings and shows you how to cash in on them. Send for it today.

Important Notice:—Valuable territory franchises are still open. Ask for our dealer proposition.



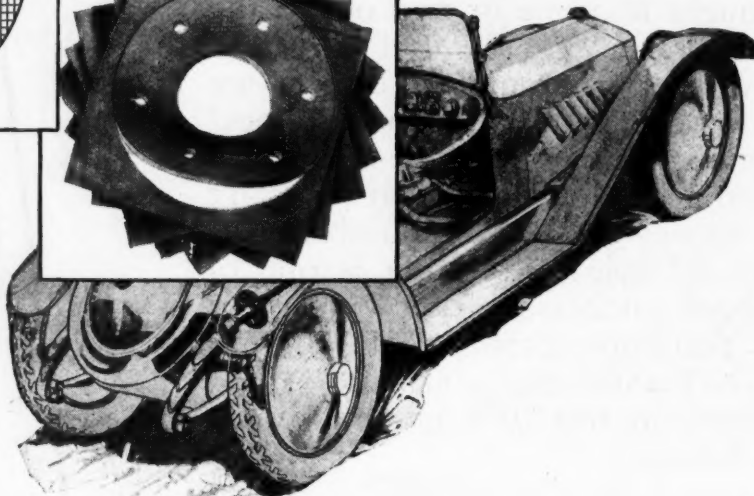
T-N-T Engineering Co., Inc., Newark, N.J.



Above is an ordinary fabric disc, its layers of fabric laid parallel. The three black holes are the driving bolts—the three white ones the driven. Note that the left hand driving bolt is the only one that can pull in the direction of the cotton strands. The other two must pull on a bias. This stretches the whole disc out of true, causing vibration and "whipping" of the shaft.



Now examine the Thermoid-Hardy patented Fanwise Construction. The disc is built up with the strands of each fabric layer running in a different direction. Each sector is equally strong, equally elastic. Every stress is balanced—the torsional, the centrifugal, and the lateral. This eliminates vibration and holds the shaft in true on every revolution.



Both fabric discs—but the resemblance stops there

Why one universal will stretch while the other holds shaft true on every revolution

When the flexible fabric disc first began to displace the metal universal, it had one big fault—it pulled out of true after a few thousand miles, causing vibration and "whipping" of the entire shaft.

Not until the famous Fanwise Construction of the Thermoid-Hardy disc was worked out did the fabric universal become a practical necessity.

The Thermoid-Hardy Joint was perfected to eliminate backlash and its accompanying troubles. Its flexible fabric discs cushion even the heaviest blows. It transmits a smooth, even flow of power instead of jolts and lost motion.

Examine the Thermoid-Hardy disc, with its patented Fanwise Construction. This disc is built up in layers, but the strands of each layer run in a *different direction*. The result is an even stress at every point—an equal strain between every pair of bolt holes.

Contrast this construction with that of the ordinary disc. Its layers of fabric are laid *parallel*. This means that only the left hand driving bolt can pull in the direction of the strands of cotton. The

other two must pull *across*—on a bias. Stretching of the disc soon follows.

Fanwise Construction gives enormous strength

Fanwise Construction has added to elasticity a *rugged strength*. The Thermoid-Hardy universal withstands a torsional strain that twists a two-inch steel shaft—it is good for over 60,000 miles on a heavy truck, over *any* road, and without attention of any sort.

Thermoid-Hardy discs are now packaged for distribution through jobbers and dealers for replacement sales. Full information, prices, and discounts sent on request.

A book you should have

We have prepared a book, "Universal Joints—Their Use and Misuse," that treats the subject from every angle—the mechanical principles, construction, lubrication, manufacture, strength tests, and records of performance. Send for your copy today.

THERMOID RUBBER COMPANY

Sole American Manufacturers

Factory and Main Offices, Trenton, N. J.

New York, Chicago, Los Angeles, Atlanta, Detroit, Seattle, Kansas City, Boston, Cleveland, San Francisco, London, Paris, Turin

LIST OF USERS

Nelson & LeMoon
E. A. Nelson Automobile Co.
Nelson Motor Truck Co.
D. A. Newcomer Co.
O'Connell Motor Truck Co.
Oliver Tractor Co.
Oneida Motor Truck Co.
Packard Motor Car Co.
Parker Motor Truck Co.
Patriot Motors Co.
Relliance Motor Truck Co.
Reo Motor Car Co.
Reynolds Motor Truck Co.
Root & Van Dervoort Eng. Co.
Sanford Motor Truck Co.
Southwark Fdy. & Mach. Co.
Stoughton Wagon Co.
Studebaker Corp.
Stutes Mar Tractor Co.
Templar Motors Co.
Tioga Steel & Iron Co.
Towmotor Co.
Traffic Motor Truck Co.
Transport Truck Co.
Twin City Four Wheel Drive Co., Inc.
United Motors Co.
Walter Motor Truck Co.
Ward La France Truck Corp., Inc.
Geo. D. Whitcomb Co.
Wichita Motors Co.
H. E. Wilcox Motor Co.
Willys-Overland, Inc.
Zettler & Lamson Truck & Tractor Co.

LIST OF USERS

Allis Chalmers Mfg. Co.
The Autocar Co.
Available Truck Co.
Barley Motor Car Co. (Roamer)
Chandler Motor Car Co.
Crow-Elkhart Motor Corp.
Jas. Cunningham Son & Co.
Dart Truck & Tractor Corp.
The Dauch Mfg. Co.
Diamond T Motor Car Co.
Doane Motor Truck Co.
Fageol Motors Co.
H. H. Franklin Mfg. Co.
Garford Motor Truck Co.
Gramm-Bernstein Motor Truck Co.
Hawkeye Truck Co.
Hendrickson Motor Truck Co.
Highway Motors Co.
Holt Mfg. Co.
Indiana Truck Co.
International Harvester Co., of A., Inc.
International Motor Co.
Jackson Motors Corp.
Kelsey Motor Co.
Kentucky Wagon Mfg. Co., Inc.
King Zettler Co.
Lakewood Eng. Co.
Lexington Motor Co.
Locomobile Co.
Maxwell Motors Corp.
Menominee Motor Truck Co.
Mercer Motors Co.
Moreland Motor Truck Co.

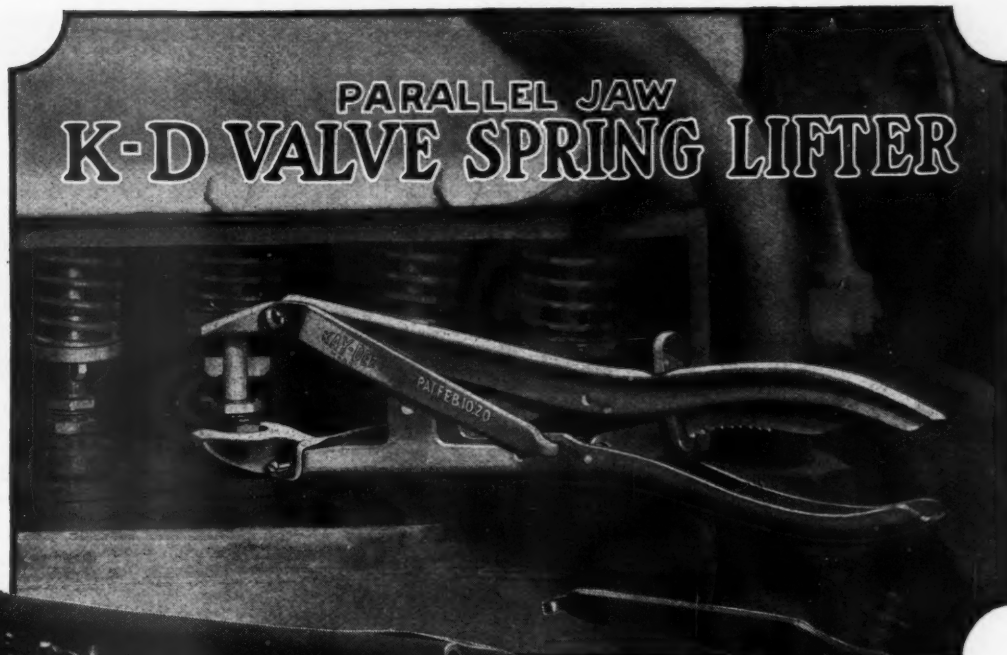
THERMOID-HARDY UNIVERSAL JOINT

Makers of "Thermoid Hydraulic Compressed Brake Lining" and "Thermoid Crolide Compound Tires"



Note how the jaws remain parallel throughout the entire lift. This exclusive feature eliminates all possibility of the washer or spring binding on the stem and raising the valves.

Also note that there are no hands holding the tool, thus allowing operator free use of both hands.



Prepare Now for the Heavy Summer Repair Work

The K-D "Universal" fits practically any make of car. Complete with extra set of jaws _____ List \$2.50

ATTENTION!

Do you know that two of the largest automobile manufacturers in the U. S. A., namely, The Peerless Motor Car Co. and The Studebaker Corporation of America, have specified the exclusive use of K-D Parallel Jaw Valve Spring Lifters?

K-D Bright Steel Washers

K-D Bright Steel Washers are made of a very high grade cold rolled steel. They are always clean cut and uniform in gauge and quality. Their high lustre finish gives them the appearance of a nickel plated washer. Made in Standard and S. A. E. sizes. They are packed in convenient 1 lb., or 5 lb., cartons and also in 100 lb., or 200 lb., kegs.

Samples and Prices
sent on request

There will be more valves ground and adjusted in the next six months than at any other time of the year. Are you prepared by having the proper tools?

The K-D is the one Valve-Spring lifter that replaces valves as easily as it removes them. Furthermore, they do the work more quickly.

Get these exclusive K-D features

1. Jaws Remain Parallel throughout the entire lift, eliminating all possibility of the washer or spring binding on the stem either in removing or replacing the valve.
2. Locking Device will stay locked in eleven different positions and will hold lifter in place when the spring is raised, thus allowing operator free use of both hands.
3. Extra Jaws, instantly interchangeable, by simply removing the fulcrum pin. Each jaw has a different size opening, the combination of these sizes make the K-D Universal adaptable to practically all L and T head motors.
4. "Parkerized" against rusting and made entirely of pressed steel. Practically indestructible. Guaranteed against defective workmanship and material.

If your regular jobber cannot supply you, write us for description and discounts, and tell us who your jobber is.

K-D MANUFACTURING COMPANY
LANCASTER, PENNA.

K-D Special Lifter for Fords and other small cars



All the advantages of the "Universal," with the exception of the removable jaws. Enables you to remove all valves from Ford motor without removing carburetor and manifold _____ List \$1.30

USE THIS COUPON

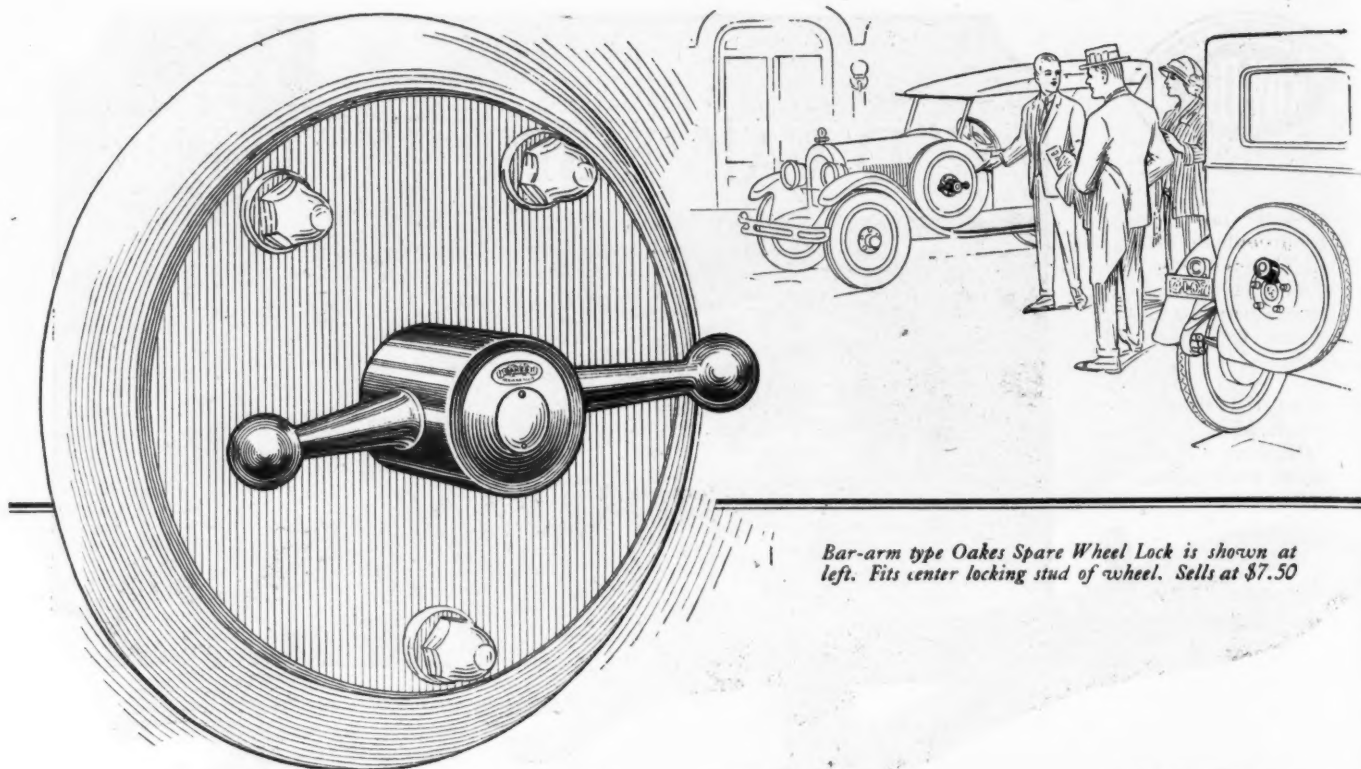
K-D Mfg. Co.,
Lancaster, Pa.

Send me description and discounts on
K-D Specialties.

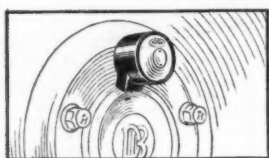
Name _____

Address _____

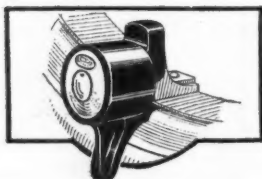
My Jobber Is _____



Bar-arm type Oakes Spare Wheel Lock is shown at left. Fits center locking stud of wheel. Sells at \$7.50



This type of Oakes Spare Wheel Lock fits on off-center locking stud of wheel.



Spare Tire Lock

You can sell this lock with every car that carries a spare tire or rim. It locks the tire securely on the carrier, and adds a touch of beauty to the car. Far better than chains, cables, straps or padlocks. Sells at \$5.00. A money-maker for dealers. Send for a sample lock.

Locks the Spare Wheel Securely and Attractively

THE motorist who buys a car with disc wheels certainly doesn't want to leave his new "spare" unprotected—an easy prey to wheel thieves. He realizes it needs a reliable lock, and is ready to buy the one you recommend.

Sell him an Oakes Spare Wheel Lock and you'll profit three ways. You'll make a quick sale, a nice profit, and please your customer.

Motorists prefer this lock to padlocks, because it combines absolute security with distinctive appearance, and does not rattle. It fits over the locking stud of the carrier, holds the wheel rigidly, and is convenient for the owner to operate. It adds a touch of beauty and refinement, and is used as standard equipment on several of the finest cars.

You can sell an Oakes Lock every time you sell a car with disc wheels. Made in types for spare wheels with center locking studs and for off-center studs. Retail at \$7.50 and \$5.00. Write nearest distributor or factory for sample lock and trade discounts—they'll interest you. Do it today, and cash in on the big summer demand.

*Oakes Spare Tire and Spare Wheel Locks are
Standard Equipment on 19 Makes of Cars.*

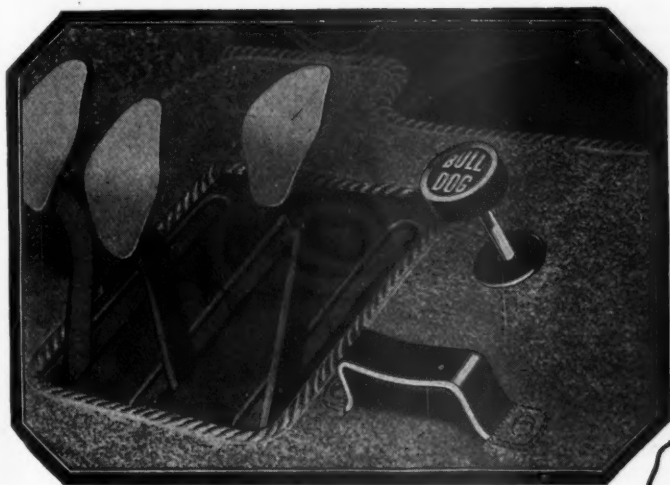
THE OAKES COMPANY, Est. 1910. Indianapolis, Ind.

DISTRIBUTORS OF OAKES LOCKS:

BALTIMORE—Gatch Supply Company, Inc.
BOSTON—Hartford Shock Absorber Agency,
319 Columbus Avenue.
BUFFALO—D & W Sales Co., 1471 Main Street.
CHICAGO—Automotive Specialty Company,
23rd and Indiana Avenue.
DETROIT—Rex Sales Co., 320 Piquette Ave.
LOS ANGELES—Charles L. Mead Company,
1313 South Figueroa Street.
NEWARK—Hartford Auto Products Company,
177 Central Avenue.

NEW YORK—E. R. Waterman, 117 W. 63rd St.
PHILADELPHIA—F. C. Hornbeck, 309 N. 15th.
PITTSBURGH—Axwell Equipment Company,
240 Second St. and 280 Moorewood Ave.
RENO, NEV.—M. R. Sloan, P. O. Box 471.
ROCHESTER, N. Y.—D & W Sales Company,
261 Central Avenue.
SEATTLE—Miller-Lowe Tire Co., 1122 Pine St.
ST. LOUIS—Noser Sales Co., 2016 Locust Street.
WASHINGTON, D. C.—Standard Automotive Supply Company, 1720 14th Street, N. W.

Oakes Spare Wheel Lock



To Look At It
You Would Never
Guess It Cost Only **\$1.50**



**Helps You Out
of Many a
Tight Place**

You Have But Two Hands Both Hands Are Needed For Safe Steering

The quick spurt that takes you out of the way of the careless driver at crossings; the instant control of power that enables you to ease over the sudden bumps, drive safely around curves or allows you to pick a trail through crowded traffic, are all motoring conveniences that can be had only with a reliable foot accelerator.

They are more than conveniences, they are safety requisites, and the Bull Dog Accelerator for Fords gives them to you at a trifling cost.

In mud and snow it saves many a stalled engine. It changes your Ford from a sleepy, plodding horse to a nimble charger—more pleasure and greater safety.

Hundreds of thousands of Ford drivers from Maine

to California have purchased Bull Dog Foot Accelerators. They would as soon dispense with them as they would their steering wheel.

The rubber covered foot pedal prevents slipping; the non-slip foot rest gives comfortable, steady, positive operation; the mat binder prevents floor mat from raveling.

The Bull Dog Foot Accelerator is carefully and stoutly constructed. Easily and quickly installed; lasts as long as the car and costs but \$1.50. Order one for your Ford today.

Dealers Order a dozen from your jobber today. They sell to Ford drivers on sight. Every new Ford means a prospect—count 'em. You can guarantee satisfaction.

Manufactured by

THE W. H. THOMAS MFG. CO.

404 W. Sixth St.

Spencer, Iowa

Sales Representatives

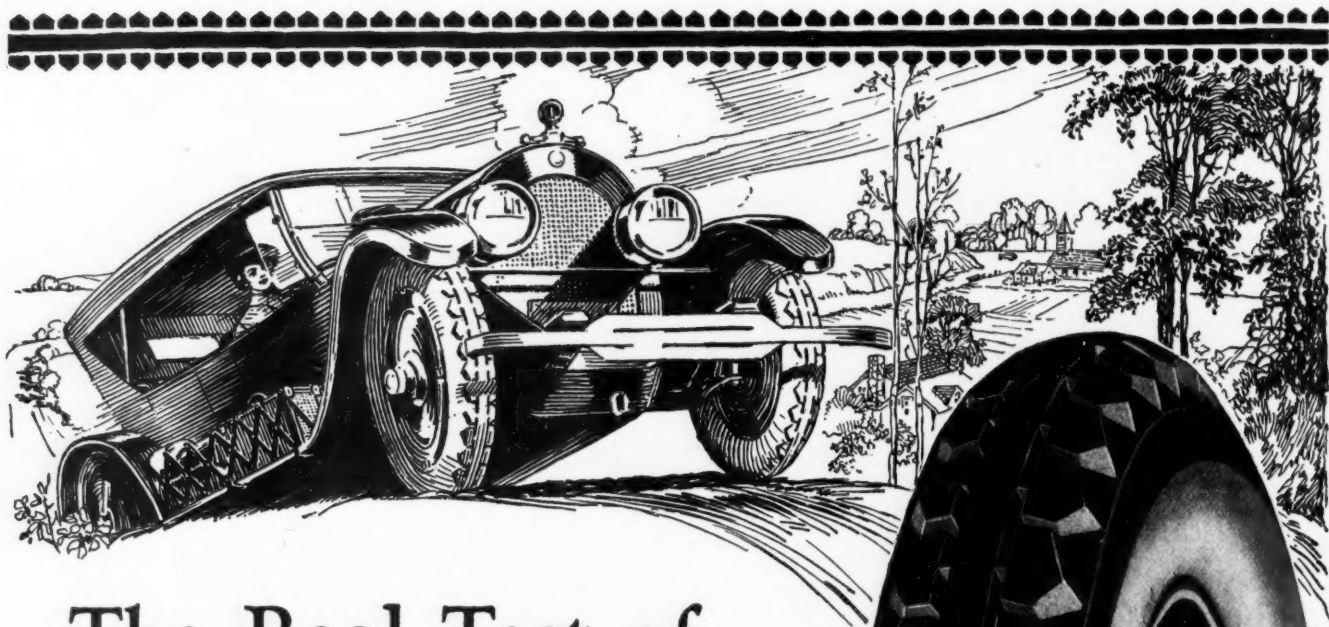
THE FULTON CO.

Milwaukee, Wis.



"Bull Dog"
FOOT ACCELERATOR *for* FORDS





The Real Test of TIRE QUALITY

Summer time is tire time. Cars are driven in the winter time, of course, but it is during the summer months that they begin to accumulate real mileage.

It is in summer that the motorist must have tires that will stand up to the job—good roads and bad, the steady grind of hundreds of miles a day, the punishment of extreme heat combined with high speed—this is the kind of work the sturdy Kokomos are built for. This is their dish!

Extravagant claims have never been used in selling Kokomos. Extravagant claims have never been necessary. A tire that has stood up for thirty years (Kokomos were the first pneumatic tires ever built) has a reputation to stand on.

Recommend Kokomos unreservedly. They are not delicate. They are built for rough work and a lot of it. Kokomo users are satisfied users.

ABOUT DEALERS:—We have a lot of mighty fine dealers, highly successful ones. We can use a few more in splendid territory. Responsible firms and individuals who are interested should write.

KOKOMO RUBBER CO., KOKOMO, INDIANA

LONG~LIFE
Kokomo
TIRES AND TUBES



"SAV-OIL" STAMPED ON BOTTOM OF EVERY RING

why it's easy
to sell the

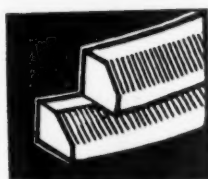


Sav-Oil rings are the only oil rings on the market with a mileage *guarantee*—1000 miles to the gallon of oil or money refunded.

We stand firmly behind this guarantee, because we know from actual experience the results obtained with Sav-Oil rings. Years of service have proven their reliability and *dependability*.

Regardless of the make of compression rings used, be sure to install these guaranteed oil rings—only one per piston. It will insure the success of the whole job.

Capitalize the value of the summer touring season—order Sav-Oils now. Window displays and descriptive folders furnished in liberal quantity—they are sign posts to quick *sales*—profitable ones too.



Top edge bevelled allowing ring to glide over oil on up-stroke—two scraper edges to return excess on down stroke to reservoir. Groove always carries supply of oil insuring proper lubrication of piston and cylinder at all times.

Territories Open for Distributors

The Sav-Oil Ring Mfg. Co.

1037 So. Figueroa St.

Los Angeles

Sav-Oil Piston Ring Co.
2056 Jackson Blvd.
Chicago, Illinois

H. W. Blevins
1532 Grand Ave.
Kansas City, Mo.

Sav-Oil Ring Mfg. Co.
550 Golden Gate Ave.
San Francisco, Cal.

C. F. Dietrick
Daphne, Ala.

C. H. Mountjoy & Co.
211 Third St.
San Antonio, Texas

Henry R. Todd
572 Merchants St.,
Ambridge, Penn.

Announcing

The **EAGLE** Line
OF MOTOR CARS

Eagle Four *Eagle Six*

Built By DURANT

Ready August 1st

DURANT MOTORS, INC.

1819 Broadway, New York, N. Y.

FACTORIES:

Elizabeth, N. J.

Long Island City, N. Y.

Bridgeport, Conn.

Lansing, Mich.

Flint, Mich.

Muncie, Ind.

Leaside (Toronto) Ontario

Oakland, Cal.

**Sell
this \$9.80 Set
to Ford Owners**

**Outfit Complete
in Every Detail**

This \$9.80 outfit for Fords is complete with Ton-Tested Pressure Gun, Shackle Bolts, Steering Bolts, Tie Rods and all other fittings (as shown below).

Each piece is of the highest quality and workmanship ever put into a pressure lubricating system.

Attractive appearance has great appeal; nickel-plated pressure gun and gun-metal finished bolts.

So perfect is the machine work and finishing that a man of ordinary strength is capable of creating terrific pressure without effort.

Every gun is tested against leakage under one ton pressure with light oil at the factory.



Do you realize that this Rose Outfit for Fords has opened a market worth millions to the Automotive Trade of this country?

Five dominant points of excellence make it an outstanding leader—Quality, Price, Self-Filling Feature, Careful Inspection and Testing and Powerful Advertising Helps.

You cannot ignore the tremendous appeal this remarkable product has to the six million Ford owners in the United States.

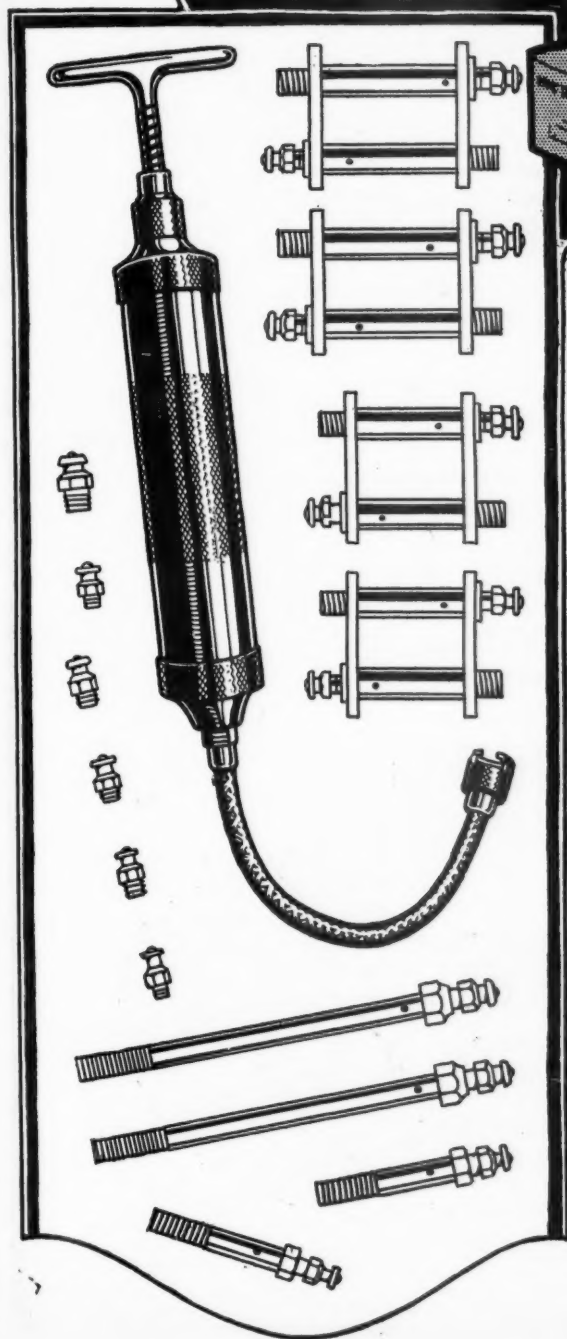
Eventually you must carry the Rose. Why not be getting the cream of the business NOW?

Get in touch with your jobber today. He will show you that the Rose System is a mighty profitable source of business.

FRANK ROSE MFG. CO., Hastings, Nebr.

ROSE

**HIGH PRESSURE
LUBRICATING SYSTEM**



Unequalled as a Tire— Unapproached as a Business Builder

The experience cited by Earl Bengtson is not surprising — being supported by numerous similar instances where Fisk Flat-Tread Cords have delivered simply unbelievable mileages on *trucks*.

It naturally follows when this big Flat-Tread Cord is used on large passenger cars its success is assured. The trend is developing rapidly to use Fisk Flat-Tread Tires on fine cars where the extra riding comfort is valued.

The Fisk Tire Company, Inc.,
2508 S. Michigan Ave.,
Chicago, Ill.

120-132 North First Street
Rockford, Ill.
May 2nd, 1923.

Gentlemen:—

We have been having such wonderful success on "Fisk Flat-Tread" truck tires, that the writer thought perhaps you would like to hear about them.

While we have a large number of Flat-Treads in service and giving seemingly unheard-of-service, I want to call your attention to one case in particular—of two 36x6 and two 40x8 Flat Treads on a 2 ton White, operated by one of the large construction contractors in Rockford. These Tires have been running for nearly 14 months and look good for 5,000 more miles.

Isn't this sufficient reason why it is a pleasure to sell Fisk Tires?

Yours very truly,

EARL BENGTON.

There is a special group of fine-car owners right near you who want to enjoy the luxury of a fine tire such as this. Simply show them the Flat-Tread — call their attention to the way it cushions any road and the obvious surplus mileage and you will at once open up a new source of profit.

There's a Fisk Tire of extra value for every car, truck or speed wagon

THE FISK TIRE COMPANY, Inc.
Chicopee Falls, Mass.

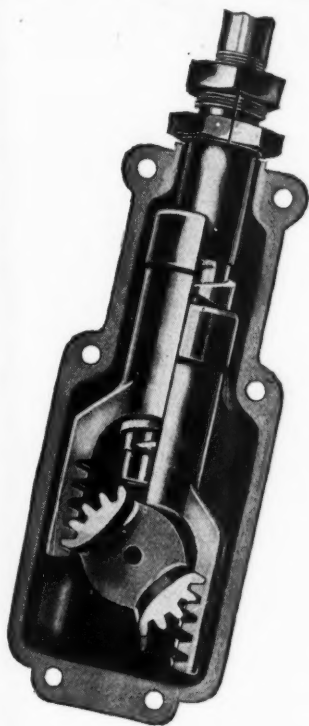


—Makes the Ford steer like a big car



C.P.C.
Balanced Pressure
STEERING
GEAR

FOR FORDS

TWO SLIDING HEADS of drop forged steel, one right and one left, each with straight tooth rack, serve to balance stresses, making steering both safe and easy.

TWO SPIRAL NUTS, hardened and ground, turning with main shaft, to which they are keyed by splines, cause the sliding heads to travel in opposite directions, up and down.

THE TRUNNION SHAFT teeth engage the racks of the sliding heads, under the push and pull of which the trunnion shaft turns. Four teeth in contact, two in each rack, give nearly three times the contact afforded by the worm and wheel type of gear.

\$16.50
at retail

The C. P. C. owner gets some real fun out of driving

YOU can say what you like about motor cars being necessities, the fact remains that most people buy them to begin with because they expect to have a whale of a good time driving around in them—just for the thrill of motion, the freedom from confinement, the opportunity to breathe some fresh air, see some new scenes and get into closer communion with life and space and beauty.

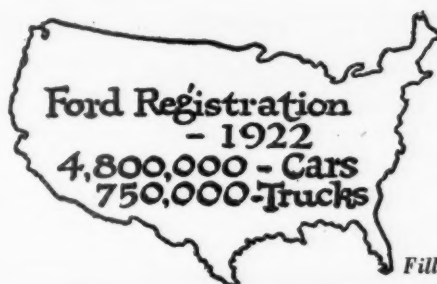
Yet how often they are denied the full realization of these pleasures because of fatigue and muscle weariness. The driver can't look about him because the wheel demands all his attention—he can't enjoy himself at the end because

every rut and bump and irregularity in the road is communicated to his aching arms through the steering gear, and exhaustion robs him of his capacity for enjoyment.

Is it surprising that he so cordially welcomes any practical means of relief—that he speaks of the C. P. C. Balanced Pressure Steering Gear as the greatest boon that has come into his motoring life? Here is a gear that was designed to bring easy steering, banish all shocks, stop the exasperating "wobbling" of the front wheels, prevent the dangerous locking and breaking of gears—a gear that can be installed in a short time without altering or dismantling any part of the car, without any drilling or tapping, and without any special tools, other than those that are supplied as regular equipment.

We have a proposition of highly profitable interest to dealers, repairshops and service stations, which we will be glad to explain in detail to all who inquire.

Write today for particulars.



The Recording Devices Co.

12 Norwood Ave.

Dayton, Ohio

Fills a universal need for the Universal Car



The Sign of the Genuine

STUTZ SIX

Touring Car

\$1995

F. O. B. Factory

5-Pass. Sedan

\$2550

F. O. B. Factory

**it's
a great
car**

For Permanence and Profit!

Investigate the Stutz dealer proposition and you'll find everything concerned with it just the way you would have it if you had arranged it yourself! Factory—finances—product—advertising co-operation—liberal discounts—protection against price declines—*no forced quotas*—and the fairest franchise you ever cast your eyes over! Here is an account that offers the automobile merchant a chance to develop with one of the fastest-growing opportunities in the motor car business today. You owe it to yourself to investigate its possibilities for your territory. Write or wire for particulars.

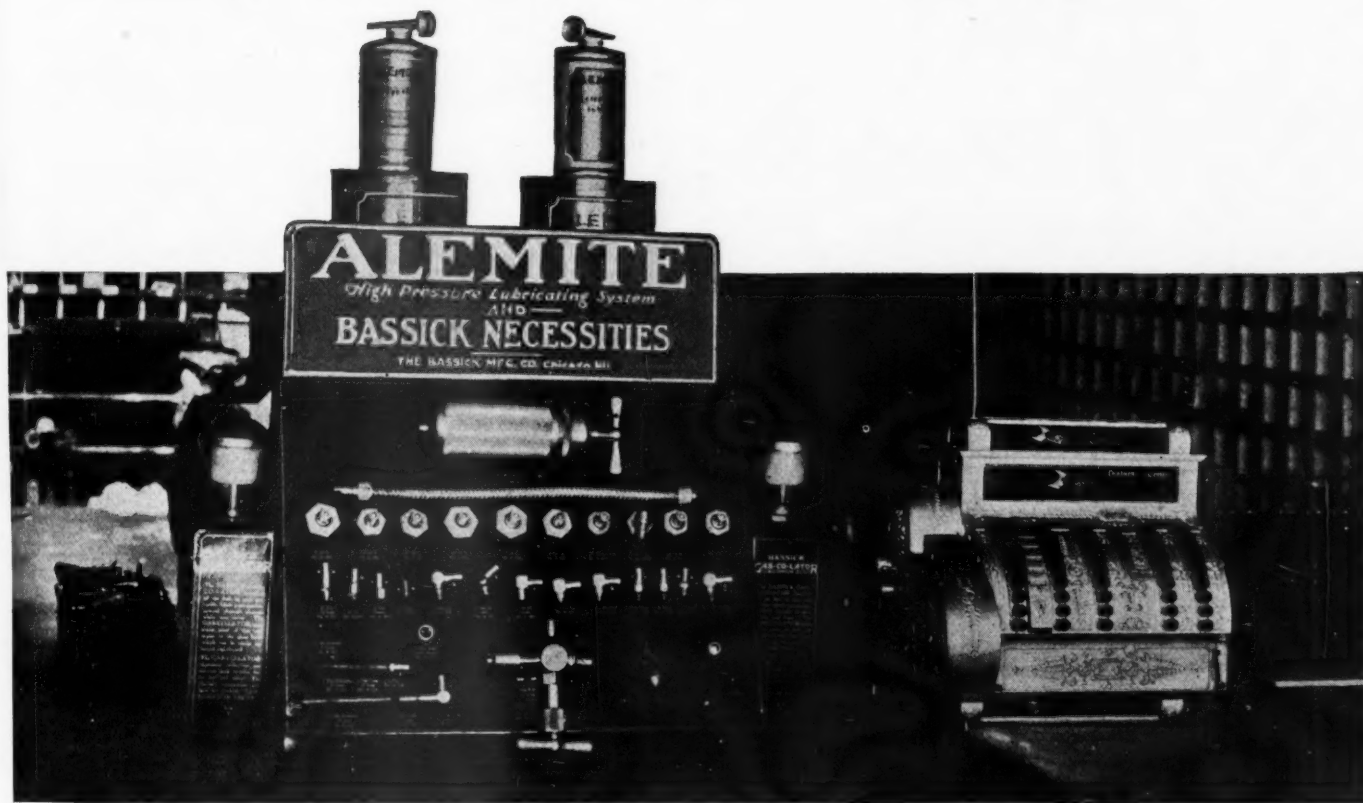
STUTZ MOTOR CAR COMPANY of AMERICA, Inc., Indianapolis, Ind.

Builders of the Original and Genuine Stutz Motor Cars



ALEMITE

High pressure lubricating system



Alemite "Quick Sales" Cabinet Brings 100% Increase

The Hines Automobile Company of Jackson, Mississippi, had always done a good business on Alemite Products, but a few months ago they decided to put in an Alemite "Quick Sales" Cabinet. From the very first day their Alemite sales began to climb and before the month was over they showed an increase of 100%. And they've kept up that pace ever since.

"For the amount of money invested," says Mr. J. A. Bumpus, Service Manager, "Alemite is the best accessory we are handling. And the Alemite Cabinet is one of the best salesmen we ever had. It seems to get its message over to nearly every customer that calls."

With the Alemite "Quick Sales" Cabinet and the Alemite Equipment Manual, you can offer complete installation of the Alemite High Pressure Lubricating System on all makes and models of cars, with a surprisingly small stock of parts. And every time you equip a car with Alemite, you make a regular customer for replacements, Alemite Lubricant and other Alemite Products.

If you don't handle the Alemite line or if you haven't an Alemite Sales Cabinet, mail the coupon *today* for complete information.

THE
BASSICK
MFG. CO.
2662 N. Crawford
Ave., Chicago,
Illinois

Without any obligation on my part, please send me complete information regarding the Alemite line and the Alemite Sales Cabinet.

I sell.....cars

(Name of car)

I operate { filling station ☐
lubricating station ☐
garage ☐
(Check which) accessory store ☐

Name

Street

City..... State.....

THE BASSICK MANUFACTURING COMPANY

2662 N. Crawford Avenue

Chicago, Illinois

Canadian Factory: Alemite Products Company
of Canada, Ltd., Belleville, Ontario

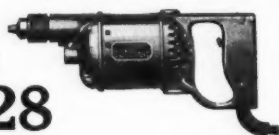
Dependable Tools!

The Cincinnati "Junior"

1-4" PORTABLE ELECTRIC HAND DRILL

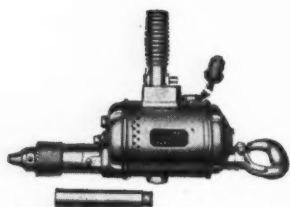
PRICE

\$28



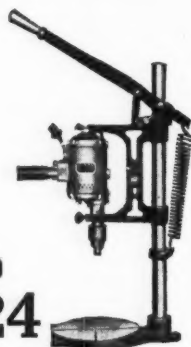
Pistol Grip with Automatic Switch. "Stream" Line Design for Close Corner Work. All-aluminum Motor Frame. Simple in construction, with no complicated parts to get out of order.

1-2" "SPECIAL" DRILL AND
COMBINATION BENCH DRILLING STAND



DRILL

\$65

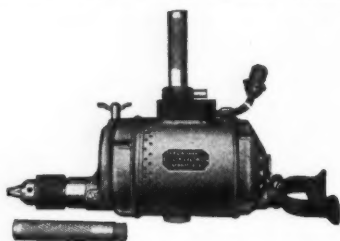


STAND

\$24

Light Weight. Ball Bearing. Universal Motor. A drill for general all-around use, particularly adapted for garages, service stations, etc.

1-2" HEAVY DUTY
SINGLE AND TWO-SPEED DRILL



Ball Bearing. Universal Motor. Mandrel with small wheel can be inserted in chuck for light grinding. For heavy duty and continuous service.

A complete line of Portable Electric Drills from 1/4" to 1 1/4" capacity. Send for catalog.

GRINDERS

BENCH—FLOOR—TOOL POST—AERIAL

TIRE ROUGHING AND FINISHING LATHES

**THE CINCINNATI
ELECTRICAL TOOL COMPANY**

1515 Freeman Ave.

Cincinnati, Ohio

NEW YORK
50 Church St.
SAN FRANCISCO
918 Hearst Bldg.

SEATTLE
1115 Federal Ave.

PHILADELPHIA
1220 Real Estate Trust
Bldg.
LOS ANGELES
510 Equitable Bldg.

*—the weatherproof steel case ignition battery
that defies the elements!*



When you sell your customer a Columbia Steel Case "Hot Shot" Battery, you sell him the best ignition battery in the world!

That's why it's the most profitable battery for you to sell. You furnish him the best ignition service for the longest time, and you hold his trade.

Stationary gas engines, tractors, and non-self-starting Fords are your Columbia market. We carry this market to your very door on a high tide of advertising. We assist you to the utmost with Cooperative Selling Helps, with Store and Window Displays, and with Real Service.

Your jobber knows

NATIONAL CARBON COMPANY, Inc.
Long Island City, N. Y.

Atlanta Chicago Cleveland Kansas City San Francisco

**Columbia
Dry Batteries**
—they last longer



— POWER! —

OH Boy! "It's a grand and glorious feeling" to step on the old Ford, and have her kick up her heels and run up the side of a house on high.

It is impossible to get the maximum power, as well as economy unless your motor has **adequate lubrication**. Install a Ford Faithful Oiling System on your car right now! It will insure, through proper lubrication of motor and transmission, a wealth of power, pep and stamina, as well as freedom from trouble and expense.

A Ford that has scored cylinders is expensive to run and lacks that reserve power that makes driving a pleasure. Eliminate scored cylinders and burnt out bearings with a

Ford Faithful Oiling System

Complete

\$5.75

DEALERS—The Ford Faithful Oiling System not only adds power to the Ford but it has the power of making satisfied friends for you as well as a "powerful nice" profit.

Write **today** for special dealers' proposition.

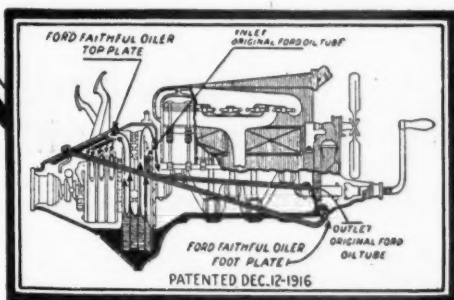
W. O. Thompson Mfg. Co.

PASADENA 330 Mountain View St. CALIFORNIA

Ford Faithful patents are being upheld. Infringers will be prosecuted to the full extent of the law.

FORD FAITHFUL

OILING SYSTEM



Automobile Engineers Know!

USE

Genuine
D & B

(The Original)

SILENT TIMING GEARS

When a product is adopted by leading manufacturers of automobiles as standard equipment you may be sure it has passed successfully every test known to determine its quality. Automobile engineers take no chances. They know quality when they see it and they are satisfied with nothing short of absolute dependability of operation.

The same reasons that have won first place for D. & B. Timing Gears in the estimation of leading engineers have won first place for them in the estimation of leading service men. There are now three-fourths of a million D. & B. Gears in use. They may be had for all popular engines.

Write for latest price list and the name of the jobber nearest you.



2333 Michigan Blvd. Incorporated Chicago, Ill.

Avoid
Imitations
and
Substitutes



Take the Drudgery Out of Drilling

with—

TEMCO

Trade Mark

Electric Drills

Made in Five Sizes

When you see a drill eating its way through a piece of steel—or even through a block of wood—just remember the job isn't always as easy as it looks. Before service can come out of a drill, it must have plenty of "stuff" built into it.

Then too, holes are often needed in thousands of hard-to-get-at places. It takes power and stability to deliver continuous service under those circumstances. The record of TEMCO Tools is proof of TEMCO Quality. (Read letter at right.)

TEMCO Drills and TEMCO Grinders are handled by your Jobber. 'Twill pay you to get acquainted with him,—and them. If he doesn't happen to have TEMCO Tools, write us direct, giving your Jobber's name. Meanwhile send us YOUR name; —Tim wants to write you.

The Temco Electric Motor Co.

706 Sugar Street

Leipsic, Ohio



Model "K"
1/2" Heavy Duty Drill

Look At This—

"The Model 'J', 3/8" Temco Drill purchased in April, 1922, has been in constant use six days per week, drilling lead connectors on from thirty to forty batteries per day. Prior to using your drill we were in trouble all the time,—in fact, the drills we had were laid up for repairs most of the time, but your Temco does the business."

Des Moines Storage Battery Co.

"Guess that's going some—"

said *Jim*

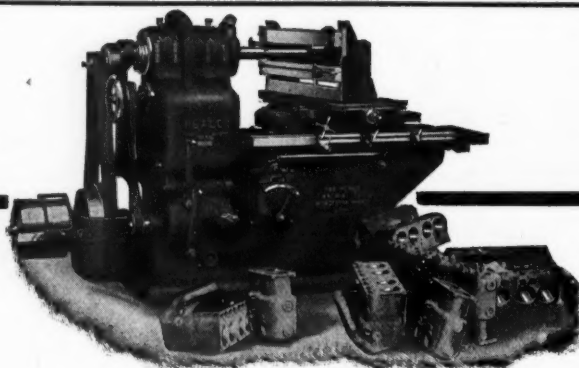
Repairmen and Motor Owners Unanimously for the HEALD

THE REPAIRMEN choose the Heald for its economy in producing the highest grade of work. The Heald Universal Jig permits quick set-ups and accurate location of the cylinder bloc regardless of size or type. Simplicity of control eliminates lost motion and accurately graduated dials supplant guesswork. Every factor for cutting time from floor to floor is incorporated in the design and the minutes saved on every bloc show in dollars in the day's profits.

THE CAR OWNER demands Heald regrinding because of its efficiency and economy. A Heald-ground cylinder is as perfect as mechanical means can make it. 90% of all motor manufacturers finish their cylinders by grinding and use Heald machines exclusively. Naturally the owners will want the same grade of finish when regrinding in order to maintain the high standard of their power plant.

If you are considering this work, visit several regrinding shops, get in touch with the manufacturers themselves, and finally question various motor owners as to what equipment they advise to handle this work so as to bring you ultimate success. Let us send you convincing literature or even give you a personal call. No obligation. Glad to do it.

**The Heald
Machine Co.**

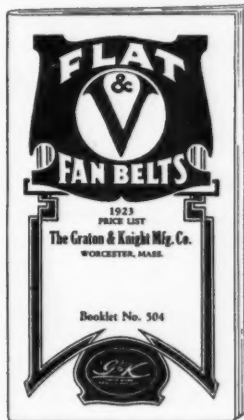


**61 New Bond St.
Worcester, Mass.**

IT IS OUT!

G. & K. BOOKLET No. 504

The Complete Fan Belt Data Book



IT WILL HELP YOU SELL
G. & K. LEATHER
FAN BELTS

REAL STEER HIDE BELTS; NATURAL COLOR

The Graton & Knight Mfg. Co., Worcester, Mass.



Kawneer Display Windows "Ask 'em to Buy"

When your show room is equipped with a Kawneer Resilient Grip Front of proper design you can display your jobs before every person passing your door. Window shoppers are easily developed into prospects and buyers.

You will find more than 260,000 Kawneer Solid Copper Store Fronts on the busiest streets of the nation. Just ask the man behind one what he thinks of the permanent and profitable service he obtains from his Kawneer show windows. These users will tell you that Kawneer Solid Copper Store Front material STAYS and PAYS.

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THE
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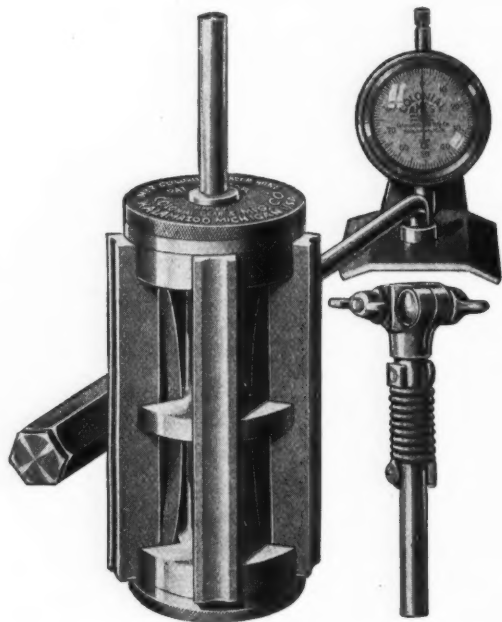
Niles, Michigan

GENTLEMEN:—Please send me without obligation a copy of the Kawneer Book of Designs.

Name

Address

When Oil Pumpers Worry You



Get This Perfect Cure

Resizing the bores with a

COLONIAL CYLINDER HONE

will absolutely stop it. Any ordinary mechanic can remove all traces of ring travel, out-of-roundness or taper, without removing the block from the chassis. Used by the Leading Service Stations. Endorsed by Engineers.



SATISFACTION ABSOLUTELY GUARANTEED

Our "Patented Concave Honing Stone" is an exclusive feature of the Colonial Hone. This Concave Face prevents clogging of the stones and keeps them sharp and smooth.

Send for trial offer and descriptive folder.

Colonial Gear & Mfg. Co.
Kalamazoo, Michigan

Ford Owners Like It

Naturally Ford owners like the Atlas because its outstanding merit is obvious and its price is right.

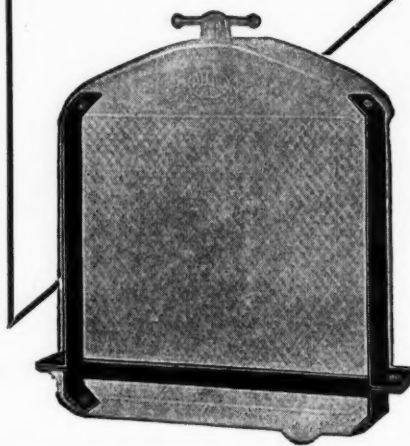
And because Ford owners like it—Dealers like it, too.

It's a "best seller" and every sale brings in a worthwhile profit.

Write for full details.

STEIDLE MANUFACTURING CO.
Cincinnati, Ohio

ATLAS Radiators for FORDS



Because

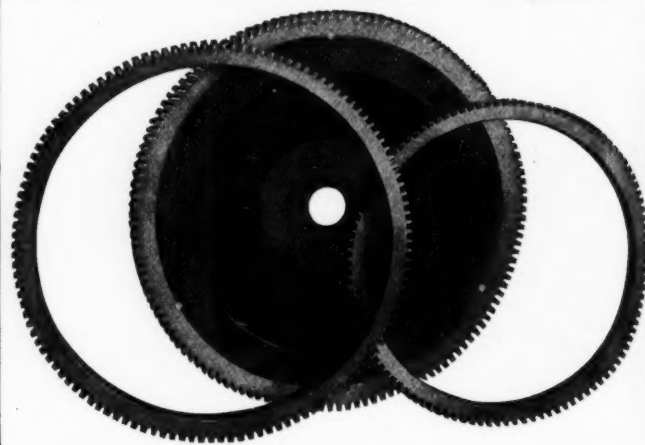
The Atlas has a flattened tube construction which gives it three times the water capacity of the tubular type and four times the cooling area.

Because of its increased cooling area it will not overheat in summer, and it will not burst in winter because its brass honeycomb core is flexible and expands as the water freezes.

The Atlas, furthermore, has a heavy steel bar across its rear face, which is integral with the bracket supports and the radiator sides.

This means not only a stronger radiator, but a reinforcement of the frame as well. THE ATLAS FITS THE FORD SHELL. Dealers who are installing new radiators on Ford cars can save their customers money by using the old shell.

"The Radiator with the Backbone"



New Low Prices On Fly Wheel Rings

Increased quantity production has enabled us to get out a new and lower price list on Meachem Steel Gear Rings for Fly Wheels. Also our trade discounts have been increased to more than offset the lower list prices. Write us for the new list and discounts.

The Meachem Gear Corp'n.

Ring Dept.

Syracuse, N. Y.

Prices Reduced

On Comfort Triplicate Repair Order—FORM 100

Millions of this form sold! Because of this greatly increased production we now make you these lowered prices:

500 Sets—\$10.20 1000 Sets—\$14.80

2500 Sets—\$34.40 5000 Sets—\$61.20

Also this special price on lots of 5000—

5000 Repair Orders

with name printed on 1st and 2d copy

\$66.20

5000 Repair Orders

name printed and all three copies numbered

\$71.20

Printing name and address on the original and duplicate sheets only, \$2.00 per thousand sets extra. If less than 1000 is ordered, the printing charge will be \$2.00.

Numbering all three sheets, \$1.50 per thousand sets extra.

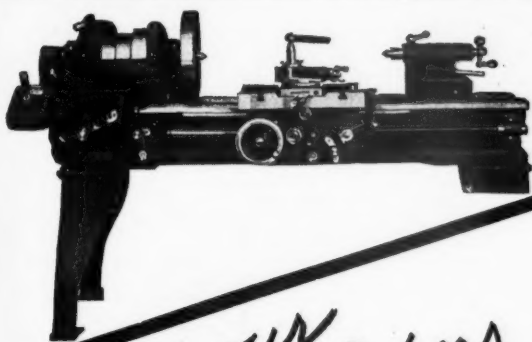
Punching charge, 60 cents per thousand sheets.

Sufficient Supply of Carbon Paper with Every Order.

Send Your Letterhead if Name and Address is to be Imprinted

Prices F. O. B.
Your City

Comfort Printing Specialty Company
101 N. EIGHTH ST. ST. LOUIS, MO.



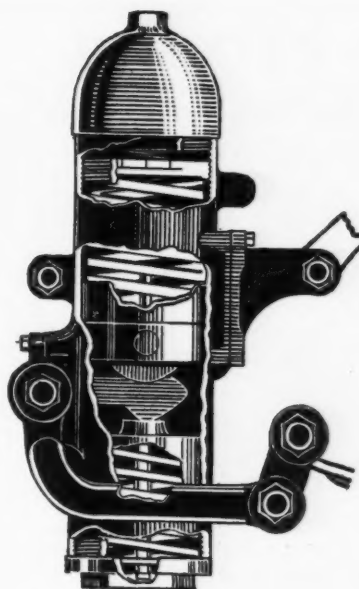
Get our Lathe Prices

We offer garages and repair shops the most lathe for the least money. Been building lathes for 20 years—and we know what your special requirements are. Hundreds of C. J. Lathes in use in the automotive field. 13, 15 and 16 inch swing, 5 to 12 foot lengths. Don't buy a lathe until you have our Bulletins and Special Price Discounts. A postal card will bring them.



**CARROLL-JAMIESON
MACHINE TOOL CO.**

BATAVIA, OHIO



A shock absorber that is absolutely right in action, results, and price.

Have you our latest booklet?

The
LOMAR
Manufacturing Co.
Middletown, Ohio

Stafford's AUTO PRODUCTS



Stafford's Carbon Remover

is a superior preparation for the removal of carbon deposits from cylinders, pistons and valves. It can be relied upon to eliminate all carbon troubles such as knocking, pre-ignition, loss of compression and power, etc.

Write for particulars about
the Stafford Line

Backed by a reputation of 65 years' standing, the Stafford Line includes these fast-selling products:

Renol, the Creamy Polish
Penetrating Graphite Oil
Radiator Stop Leak
Black Liquid Tire Cover
Auto Cushion and Top Dressing
Generator and Magneto Oil

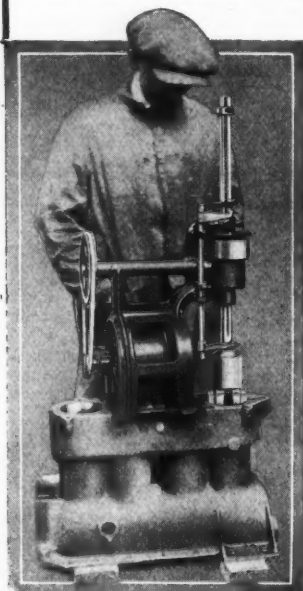
Cleaning Fluid
Gasket Cement
Gasket Shellac
Metal Polish
Neatsfoot Oil
Rapid Tar Remover

Rapid Repair and Engine Enamel

S. S. Stafford, Inc., 603 Washington St., New York

Finish All Cylinders With This One Storm Tool

Even biggest tractor cylinders eight inches in diameter. A Storm Cylinder Finishing Head handles all cylinder work without the bother and lost time of changing heads, parts, blades or hones. The ideal tool to resize cylinders without other machining operations, or to polish after boring, grinding or reaming for that Storm "gun-barrel" finish so popular today.



Price
\$36.25

Capacity
2 3/4 - 8 in.

You can make more money with this head than any other tool or machine in your shop. Use it with electric drill or Storm Cylinder Finishing Machine—an automatic, motor powered machine for driving the Storm Head that eliminates all mechanic's time to operate. Ask your jobber, or write for new Storm Book on Modern Cylinder Methods.

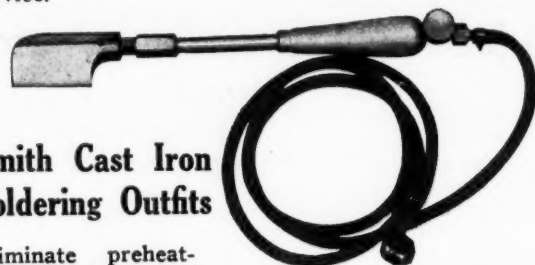
STORM
MFG. CO.

Storm Automatic
Cylinder Finishing Machine

406-A Sixth Ave. So., Minneapolis

Repair Cracked Motor Blocks in Your Own Shop

Cracked motor blocks and cylinder heads, cracked and scored cylinders—you can repair all these jobs right in your own shop and in many cases without removing the engine from the frame. You can keep this profitable work for yourself and give better, quicker service.



Smith Cast Iron Soldering Outfits

Eliminate preheating and danger of warping or distorting castings. Make a quick, thorough and permanent repair. Also handy for all other jobs requiring a soldering iron, such as radiator, ignition, etc. work.

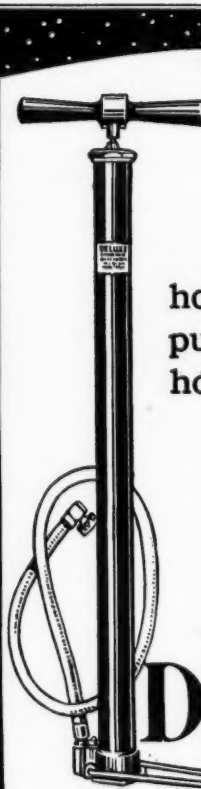
Price
Complete **\$20.00**

Ask Your Jobber or Write
for Booklet

**SMITH'S
INVENTIONS
INCORPORATED**

Minneapolis

Exclusive Manufacturers of Welding and Cutting Equipment



An
honest-to-goodness
pump, backed by an
honest-to-goodness
guarantee

ORDER DIRECT
SPECIFYING
JOBBER

The
DeLuxe
TIRE PUMP

Also
ARVIN HEATERS
DE LUXE,
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INDIANAPOLIS PUMP & TUBE CO.
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A Gasket Paper That Saves You Money



Every Shop Can Use Adpasco

Adpasco Treated Gasket Paper is needed in every shop for every use except in contact with extreme heat. Don't use expensive packings where Adpasco can be employed in an efficient manner. Adpasco will save you money.

Is **Treated**—will not rot out and crack like ordinary paper makeshifts. Soft, pliable, holds its shape.

Size 36x40 in. Sold by over 400 jobbers. Used daily in thousands of shops.

Advance Packing & Supply Co.

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Chicago, Ill.

Pac. Coast Distributor: Allied Industries, Inc., San Francisco, Los Angeles, Seattle



**FOR
OIL
PUMPERS**

Torpedo REFLEX SPARK PLUGS

A Plug for Every Motor Condition

- | | |
|---|-----|
| (1) Normal Motor—"Giant" Reflex..... | 90c |
| (2) Hot Motor, Light Duty—"Arrow" Reflex..... | 75c |
| Ford size | 60c |
| (3) Hot Motor, Heavy Duty—"Diamond" Reflex..... | 90c |
| (4) Oil Pumping Motor—"Torpedo" Reflex..... | 90c |

Liberal Discounts to Dealers

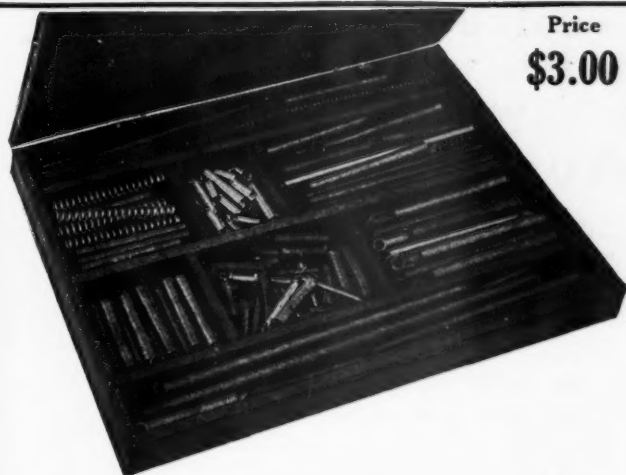
Write for "Spark Plug Recommendations"—it explains the proper Spark Plug for each motor condition.

THE REFLEX IGNITION CO.

3070 West 106th Street, Cleveland, Ohio

Since 1909—Makers of Spark Plugs Supreme

Springs For All Purposes



Price
\$3.00

Peck's Assortment of coil springs contains about everything needed in the busy Garage, Service Station and Repair Shop in the shape of springs.

It is also a ready seller over the Accessory counter. The car owner finds it to be just what he wants and needs. Always ready—no stopping to

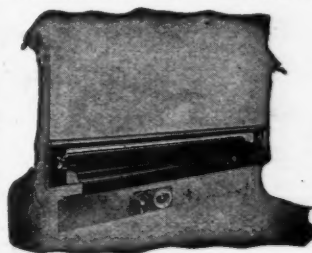
make—no waiting—just reach into the box and pick out what you want.

Peck's Assortment of Coil Springs comes to you in a well built wooden box, partitioned off into convenient spaces. Handy, efficient, good. Order your box today. Jobbers—write us for prices and discounts.

THE PECK SPRING CO.

PLAINVILLE

CONN.



Perfect Ventilation

*Reduces discomforts
of hot weather driving*

The Phillips "Keep Kool" Ventilator is new—something to make the driver more comfortable and keep him in a happy mood. Ford owners will be glad to know about it. Show it to them.

7 REAL ADVANTAGES

- | | |
|---|---|
| 1. Gives more ventilation than a tilted windshield or any other ventilator on the market. | 5. Adjusted in an instant—no screws to make tight or loose. |
| 2. Directs cool air on the feet of the driver. | 6. Can be locked in any position and does not rattle. |
| 3. Absolutely rain tight when closed—protects the coil box. | 7. Adds to appearance of the car and very easily installed. |
| 4. Made to fit standard Ford windshield frame. | |

Jobbers and Dealers. This is a thoroughly tested article—guaranteed. Sells readily and at a good profit. Distributors Wanted! Write for your territory now!

F. C. PHILLIPS CO., Stoughton, Mass.
Manufacturers Screw Machine Products.

Not a Specialty



A Necessity

KOZY WINGS

THE ORIGINAL



CUSTOM MADE

New Prices increase sales

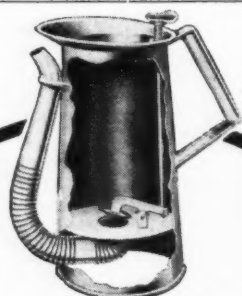
Kozy Wings selling fast at new prices. Reach every car owner.

These smart, trim wind deflectors are built to conform to cowl and dash design of each particular make of car.

All metal parts are of cast brass heavily nicked, highly polished. Will not rust. Can't rattle. Rubber footed clamps hold glass securely which prevents slipping. No holes in glass.

Dealers — Get quotations from your Jobber today. Cash in on Kozy Wing popularity. Full details on request.

The **MID-WEST GLASS Co.**
CINCINNATI OHIO, U.S.A.



The One-Trip Measure

The average car requires just one gallon of oil to fill the crank case. And with the gallon size of the Brookins Measure, that means just one trip to the tank for oil. Saves time for you and your customers.

There are quart and two-quart sizes too, all copper finished. And all Brookins Measures have the flexible metal nozzle that reaches the most inaccessible oil hole. No oil flows before you are ready. A thumb-valve controls that.

The Brookins is the one best measure for every filling station and garage. Write today for sample and prices.

The Brookins Mfg. Co.

158 Bayard St., Dayton, Ohio

Export Office, 11 Broadway, New York City.
Cable Address, "Brookins" New York, All Codes Used.

Brookins
ALL-IN-ONE LIQUID MEASURE



Effective!

Harmless!

Go 'Long Tar!

Summer—roads full of tar and grease—and the automobile owner loses his religion. He gets converted when he uses Pontoklene, the tar and grease remover that cleans and restores the original lustre of the finest automobile body. Order Pontoklene from your jobber today. Tar season is here. Retail at \$1.00 a can.

THE PONTOKLENE COMPANY

2604 Main Street

Norristown, Pennsylvania

94 cylinders resized in one week with Auto-Hone

A garage man in Kansas City did this. Sixteen jobs—ninety-four cylinders—on all classes of cars from Fords to Packards. He did this at a big profit with a single pair of Auto-Hones. He collected enough the first week to MORE than pay for his Auto-Hone.

You can do the same

Auto-Hones are made in two sizes:

For cylinder 2 13/16 to 3 3/4
bore ————— \$85.00

For cylinder 3 3/4 to 4 1/4
bore ————— 95.00

A complete illustrated direction sheet accompanies each tool which enables you to do perfect work right from the start. Don't overlook this opportunity. Send your order in or write for information today.



Slip Auto-Hone into cylinder—connect its steel driving handle to your electric drill—turn on the power—and the work is started.

It is a grinder, reamer, boring and lap machine (all in one). Pressure on the stones is regulated from the driving end of the tool. As the stones are forced out radially, the AUTO-HONE centers itself. No expert help needed.

THE AUTO-HONE CO.
GENERAL OFFICES 1587 MAIN STREET
BUFFALO, N.Y., U.S.A.

CRANE PULLER

Gets 'Em All



The most stubborn wheel lets go when the Crane Puller is used. No fear of breakage—the Crane design and Crane materials make these pulling tools more than equal to their job.

Arms drop forged from high carbon steel, screw case-hardened with inserted tool steel point.

Three models, including the new universal Two-arm, Three-arm Crowfoot model, 4 sizes of each. Real tools for busy mechanics.

Our 24-page folder gives you the whole wheel-puller story. Write for it.

CRANE PULLER CO.

Arlington

Mass.



has a thousand rust-dissolving duties in any shop

With a can of TASGON in his private garage, a motorist can keep his engine and valves forever free of carbon and its annoying influences.

He can feed TASGON to his springs—it works between the leaves, removing rust if it's there or preventing its accumulation, if not.

He doesn't have to bark his knuckles, or lose time and patience fuming over a "frozen" bolt or nut, for a few drops of TASGON will quickly penetrate the affected thread surface, lubricate it—and free the part.



Dealers and Jobbers will find it well worth while to learn the details of our trade offer—and send for discounts, counter displays, sales helps, etc.

Likewise "frozen" door hinges or locks, rust-marred nickel or metal surfaces are immediately rid of this offending substance.

Write for the unusually interesting details of the rust and carbon-melting material.



POLYGON PRODUCTS COMPANY
141 Milk Street Boston, Mass.

TASGON — The Magic Fluid That Dissolves Rust

HOOVER

The World's Largest Ball Plant

STEEL · BRASS · BRONZE
MONEL METAL
BELL METAL
ALUMINUM
and
HOLLOW BALLS

HOOVER STEEL BALL CO.
ANN ARBOR, MICHIGAN

ACCURATELY MACHINED **SEMI-STEEL REPLACEMENT PISTONS** ACCURATELY MACHINED



For replacement work after a rebores or re-grind job insures your customer as good if not a better job than the original assembly.

Dall Pistons are simply GOOD Pistons, made to manufacturer's specifications, sometimes more refined in design and lighter in weight, but always as carefully made and inspected as though they had to pass the most rigid inspection of a Motor Manufacturer.

Dall Pistons are regularly furnished in standard and various oversizes, also semi-finished 1/16 oversize.

Write today for price list and delivery schedule on all items. Distributors at various points will take care of your requirements.

THE DALL MOTOR PARTS COMPANY

Post Office Station D, Cleveland, Ohio

Southwestern Branch

THE CARROLL CO.

2218 S. Harwood St., Dallas, Texas



The Bearings Company of America, manufacturers of STAR Ball Retainers, for Thrust, Magneto and Cup and Cone types of Bearings. Complete Thrust Ball Bearings, Angular Contact Thrust Bearings and Angular Contact Radial Bearings (made to your B/P's and requirements).

THE BEARINGS COMPANY OF AMERICA

LANCASTER, PA.

Detroit Office,
1012 Ford Bldg.



E-C-L Pistons

ALUMINUM ALLOY NON EXPANDING



How to Eliminate Piston Slap

Piston Slap is a common and vexatious cause of engine trouble which in the past has bothered most car owners.

But it can now be eliminated. With the E. C. L. Aluminum Alloy Non-Expanding Piston. E. C. L. Pistons may be fitted with a closer degree of clearance than cast iron pistons. They reduce the consumption of gas and oil — increase power and speed and eliminate spark knocks.

Let us tell you more about this remarkable piston. Write for the details today.

E. C. LONG

Main Office and Factory

4834 Beaubein Street

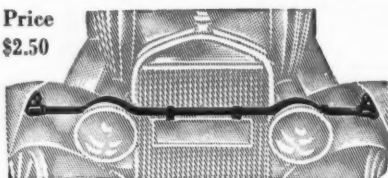
Detroit, Mich.

ARG

Fender Braces For Ford Cars

The ARG Front Fender Brace is made of selected steel and constructed so as to improve the appearance of your "Ford." It is curved over head lights and does not touch radiator.

Price
\$2.50



ARG Braces hold fenders firmly in place and keep them from cutting tires—prevent rattles and squeaks. Easy to install and long-wearing. Price \$2.50. Ask your dealer.

Liberal Discounts to Dealers

ARG
Auxiliary
Spring
Co.

Dept. 4,
Birmingham, Ala.



Re-Babbitted Bearing Exchange

We Re-babbitt any Automobile, Truck or Tractor Connecting Rod or Main Bearing with HIGHEST GRADE NICKEL BABBITT and finish them regular Factory sizes. All work guaranteed satisfactory or money refunded in full and transportation paid both ways. All RUSH Orders shipped same day order arrives.

We shipped over 100,000 Bearings last year. Over 5000 satisfied Dealers and Garages will recommend us. Save one-third to one-half your Bearings costs by sending us your work. Ship Parcels Post or Freight. We sell wholesale only.

Fremont Foundry & Bearing Works
Oklahoma City—U. S. A.

MANLEY TOWING TRUCKS



Send
for
Catalog

heavy Malleable Steel throughout and 2" telescoping tongue. Roller Bearings are hardened, 100% road clearance. The finest perfection in a Towing Truck.

MANLEY MFG. CO.

YORK, PA.

Manley Towing Trucks have 100% efficiency for bringing in disabled cars. The Double Post construction straddles the differential and takes the weight off both wheels, making it possible to use the truck if both wheels of the car are damaged, if it has a locked differential or the axle is crosswise. Under these conditions a Single Post tool is useless. Radial Race Ways support the car next to the wheels, massively built of

The Dealer's Ideal Battery

We were dealers ourselves before we became battery manufacturers.

That's why we have established a policy which helps the dealer build a real battery business and make real money.

Englert Manufacturing Co.
Pittsburgh, Pa.

Dragon Storage Battery

Every Ford Owner needs

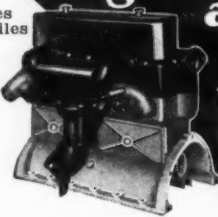
RAJO power, RAJO flexibility, and RAJO economy. All of the advantages of valve-in-head. 3 to 40 miles per hour in 16 seconds. 60 miles per hour from standard Ford models.

Increase Your Profits with RAJO Sales

It's Easy. RAJO Valve-in-Head pays for itself every season. Easier to install than grinding valves—Use Ford Head Bolts—No cutting of dash—Nothing to move.



Pays for Itself in gas saving alone



now
only
\$57⁷⁵

Get our complete proposition. Put a "RAJO window" in your store.

Rajo Motor Co.
1357 Racine St.,
Racine, Wis.

JOHNSON No. 7 Hand Torch



Requires No Forced Air Blast

The most efficient Torch for any pre-heating, soldering or repair work.

Fitted with one Powerful Johnson Burner with shut-off valve and pilot light.

Will produce a flame temperature of 2250 deg. Fahr. Is light, weighs 1½ lbs., and only consumes 10 cu. ft. of gas per hour.

Write for descriptive circular of Gas Appliances.



JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Huetter's

Fly-Wheel Gear Bands

Made of hard, tough steel and electric welded at the seam, Huetter Gear Bands withstand the battering of the starter gear as long as the car lasts.

Huetter Gear teeth are pitched and pointed to specifications recommended by the manufacturer of the Eclipse Bendix drive. Truly, "Huetter Gears are Better Gears."

Order from your jobber or direct. We will make double-quick shipments. Write today for Catalog List.

HUETTER MACHINE & TOOL CO.

538 Kentucky Ave.
INDIANAPOLIS

The Ultimate Way WET INTERNAL GRINDING

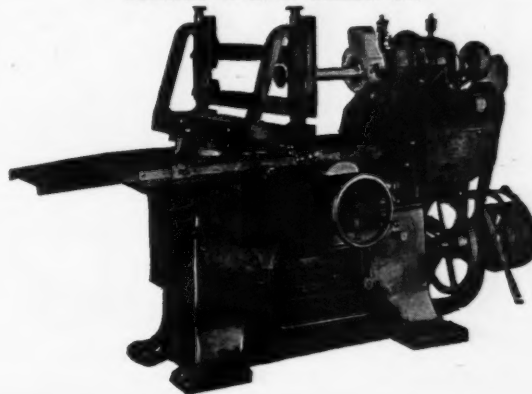
Wet grinding, as made possible by the Micro Internal Grinder is as far in advance of ordinary dry grinding as the present day automobile is over the old ox team.

Micro

The Micro is a highly developed type of internal grinder adaptable for either wet or dry grinding, at the option of the operator, permitting highest quality of results. Its automatic action, both as to cut, feed and table travel provides the most accurate work humanly possible in exceptionally quick time.

If you're going to get a grinder, get the kind that will pay you biggest returns. Our bulletin gives full information—send for it.

MICRO MACHINE COMPANY, Bettendorf, Iowa
Successor to B. L. Schmidt Co.



SOMETHING GOOD ABOUT BAD ROADS

A & B PLATFORM SPRINGS

Provide Greater Comfort
FOR DODGE CARS

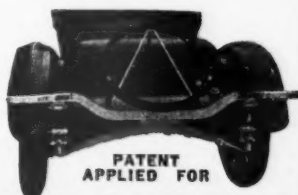
Rough Oil Field Roads Have Necessitated the Development of Special Springs

This spring has stood the severest tests. Thousands now in use.

Write for Catalogue

A&B SPRING MFG. CO.

Oklahoma City,
Oklahoma



ANNOUNCING NEW MODELS

MASTER TRUCKS

A Complete Line

SPEED MASTER— $\frac{3}{4}$ to $1\frac{1}{4}$ -Ton.

Highest Achievement for Fast Transportation

HEAVY DUTY MODELS— $1\frac{1}{4}$ to 6 Ton.



Every Master Truck built of highest grade recognized standard units, balanced over-size throughout. New models are the result of eighteen years' experience in successful motor truck building.

Write for specifications and liberal proposition to live dealers. Valuable territory still available.

MASTER MOTORS CORPORATION

2381-2399 Archer Ave.,

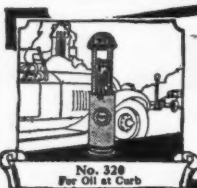
CHICAGO, U. S. A.

WEL-EVER OIL CONTROL PISTON RINGS

Write for interesting circular on oil pumping and details about this fast selling piston ring.

THE WELEVER PISTON RING CO. Toledo, Ohio
1713-15 Canton St.

Less Oil and Gas—from WEL-EVER equipped units. Its oil control feature is guaranteed to stop oil pumping, prevent spark plug fouling and reduce carbon formation.



Air Compressors; Gasoline and Oil Storage Systems; Heavy Metal Storage Tanks; Oil Burning Systems; Furnaces and Forges; Oil Filtration Systems; Water Softening Systems.

WAYNE TANK & PUMP COMPANY,
706 Canal Street, Fort Wayne, Ind.

Wayne

KISSEL

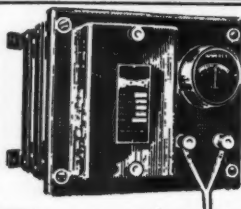
The Custom Built Car



The Aristocrats of Motordom

7 Models—Open and Closed
Distributors in principal cities. Open territory now being closed.

Kissel Motor Car Co.
Hartford, Wis.



Automobile and Radio batteries charged for a nickel. Ten million car owners and five million radio fans are prospects for

THE HOMCHARGER

BIG PROFITS. WRITE NOW.
The Automatic Electrical Devices Co.
122 West 3rd St. Cincinnati, Ohio



Just a Little Bit Ahead

—with double pole automatic switch; maximum safety and efficiency assured.

JAS. CLARK, JR., ELECTRIC CO., Inc., LOUISVILLE, KY.



Single and wide face Tailor made high grade bumpers
The Bellevue Manufacturing Company
Bellevue, Ohio

NO-LEAK-O PISTON RINGS

Won't Leak Because They're Sealed With Oil
No-Leak-O Piston Rings are making money for dealers everywhere. Their "oilSEALing" groove—found only in No-Leak-O—packs an oil film in between piston and cylinder walls like "packing" in a pump. Oil and gas stay where they belong. National advertising is helping the dealer sell No-Leak-O by teaching the motorist the lesson of more mileage on less oil and gas.



It will pay you to stock No-Leak-O at once.
Price 50c and up.
NO-LEAK-O PISTON RING CO., Dept. T-57, Muskegon, Mich.

WEIDENHOFF PRODUCTS

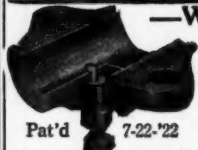
Electrical Testing Equipment
Universal Test Benches, Growlers, Magnetizers, etc.

Write today for Bulletin M-18.
4358 W. Roosevelt Rd., Chicago, Ill., U.S.A.



TAKE THE END-PLAY OUT!

—WITHOUT PULLING THE MOTOR



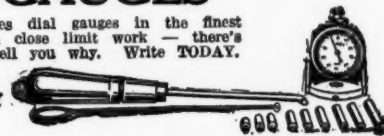
THE C. A. ADJUSTABLE CENTER BEARING CAP corrects Ford crankshaft end-play and sets magnets for highest efficiency without removing the motor. Easily and quickly installed. Guaranteed for one year. List price \$3.75. Ask your jobber or dealer or write us direct.

ADJUSTABLE BEARING CO., Inc.
Dept. M. Brazil, Indiana

DIAL GAUGES

When you find Ames dial gauges in the finest automotive shops, on close limit work — there's a reason. Let us tell you why. Write TODAY.

B. C. AMES COMPANY
Waltham, Mass.



STOPS GUESSING

Indicates definitely direction driver intends to turn. Signals at both front and rear of open or closed cars. Meets requirements of all State laws. Attractive — Durable — Effective.



Dealers — Jobbers, write for details and territory.
The Motor Products Co.
Norwalk, Ohio

BRUNNER AIR COMPRESSORS

GOOD FOR

"TWENTY YEARS AT HARD LABOR"

BRUNNER MFG. CO.,

Utica, N. Y.

bethlehem betterments

Utilities—Not EXCESSories!

R&V Knight

SIX

"EVERLASTING PERFORMANCE"

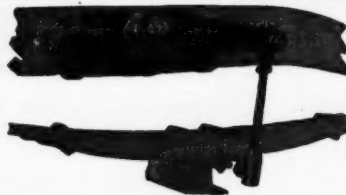
Engine Sealed and Guaranteed for 2 Years

R & V MOTOR COMPANY

East Moline, Ill.

THE HYDRAULIC CONTROL

More than a Shock Absorber because it fluid-cushions all movements between the body and the chassis—gives a new experience in riding comfort.



Good distribution territory is still to be allotted. For information write to

AUTO SPRING CONTROL CO.
Jamestown, N. Y.

"In Stock - Not Over a Day Away"

Write Milwaukee Die Casting Co., Milwaukee, Wis., for name of distributor nearest you.



MILWAUKEE BEARINGS

PAROB EXPANSION HAND REAMER

BLADES CUT AT DIFFERENT ANGLES

Each successive blade cuts AT A DIFFERENT ANGLE from the one before it.

No CHATTER, no DIGGING IN—even in keyed holes.

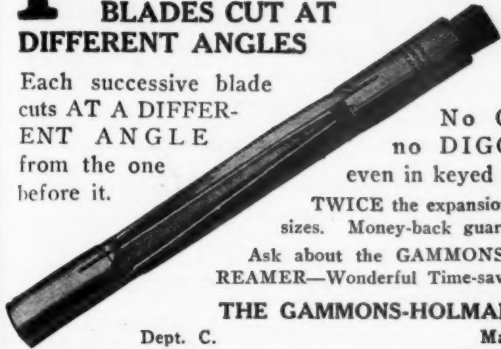
TWICE the expansion of others. All sizes. Money-back guarantee.

Ask about the GAMMONS TAPER PIN REAMER—Wonderful Time-saver.

THE GAMMONS-HOLMAN CO.

Dept. C.

Manchester, Conn.



PARANITE CABLE

Best for Automotive Work

We carry at all times a complete stock of every kind of cable used for automotive work. Many years of specialization have brought PARANITE Cables to the highest state of perfection. The finest grades of rubber compound, cotton and flexible enamel varnish are used.



FOR 33 YEARS THE STANDARD
IF IT'S PARANITE IT'S RIGHT
Quality jobbers handle quality cable—that's PARANITE.

Indiana Rubber & Insulated Wire Co.

810 Marquette Bldg., Chicago
Factory and General Offices—Jonesboro, Ind.

Noiseless Timing Gears

Install quietness—Cloyes NOISELESS Timing Gears. They give the motor a soft, even "purr"—permanently.

Cloyes Gear Works
1614 Collamer Ave., Cleveland, O.

Sales Representatives
United Autowear Co., Flak Bldg., New York City



Sells Wherever Shown INSHIELD SPOTLIGHT

Fits snugly against windshield. No glass to cut. Easily and quickly attached. Can be pointed to any angle. Beautifully finished. Easy to sell. Jobbers, dealers, write for details.

MADE ONLY BY
The Thal & Bitter Machine Co., Toledo, Ohio



GATES VULCO

Fan Belts and Radiator Hose

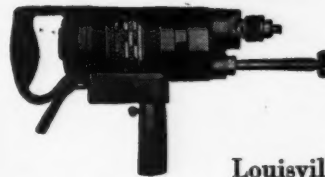
"Leaders in the Industry"



Over the top on all four
with a
Rush Timer
FOR FORDS

W. S. Rush & Co., Mfrs., 112 A. Daly St., Los Angeles, Calif.
S. S. McClelland Co., Eastern Distributor, 1926 Broadway, N. Y. City
Rush Brake Shoes—Transmission Band Oiler & Cooler

Get This "Pioneer" Garage Special



Electric Drill
and Valve Grinder

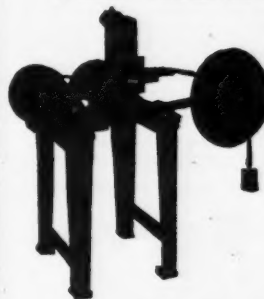
Greatest time and money saver,
as well as money maker, for
your shop—

"It Will Do The Work"

Louisville Electric Mfg. Co.

Incorporated Louisville, Ky., U. S. A.
C. E. Willey, Pres. J. B. McFerran, Secy.-Treas.

MR. RADIATOR REPAIRMAN



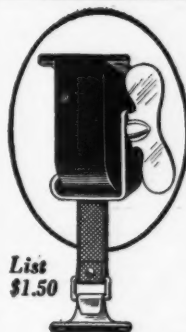
Make your own radiator cores and save 20% to 50% of their cost, give your customers quick service and a better core for less money. No need to carry large stocks of cores, and no damage in shipping. Increase your volume of business. Send for illustrated booklet describing our radiator core equipment.

Write for information to

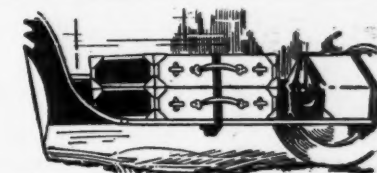
Radiator Engineering Co.

626 Nesselwood Ave.

Toledo, Ohio



List
\$1.50



Easier to Sell!

Motorists will buy the Hykon Luggage Carrier because it's the most practical carrier they have ever seen—and so inexpensive. Placed under the running board, Holds luggage secure. Durable and easy to use. List \$1.50. Ask your Jobber.

THE HYKON MFG. CO., Alliance, Ohio

Hykon LUGGAGE CARRIER



Commercial Transportation

requires a dependable motor. The new Waukesha Bus and Truck Motor assures unwavering town or country performance, at negligible upkeep.

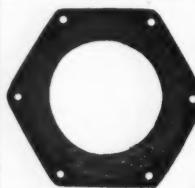
Write for details

The Waukesha Motor
Company
Waukesha, Wisconsin

Waukesha
TRADE MARK
BUS and TRUCK MOTORS

Equip Your Shop

with
HOYT Electrical Testing Instruments
Burton-Rogers Co., Boston, Mass.

**GUAY CLUTCH DISC & PLATE**

For Dodge Bros. Cars

Models for other cars will be announced shortly. Extraordinary flexibility and durability are gained by passing every thread of asbestos over and under the steel fingers at a given length of $\frac{1}{4}$ inch. Thus all strings are under the same measured spring tension. Steel and asbestos only materials used. No wires or rivets to cause uneven wear. Price of complete set, \$12.00. Good discounts to trade. Write for complete details.

JOHN C. HOOF & COMPANY

Mfg. Division

159 W. Illinois St., Chicago


**UNIVERSAL HOSE CLAMP**

Adjustable. Two sizes will clamp any hose of any diameter. Made from cold rolled steel out of wire. No rough edges to cut hose. Put on in less than a minute. Everlastingly leak-proof. Order Universal Hose Clamps. Trademark on every clamp and carton. Get them from your jobber—or write us.

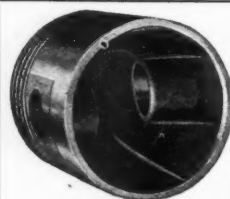
UNIVERSAL INDUSTRIAL CORP.

Hackensack, N. J.

Gill-Special-Servus

 **Piston Rings for Every Need**

GILL MFG. CO., 8300 South Chicago Ave., Chicago



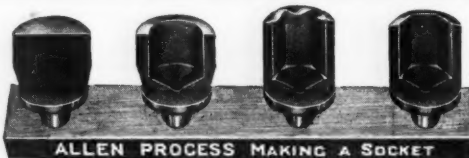
**YOU CAN GET
FOSTER PISTONS
PROMPTLY for**

almost any car, truck and tractor
FOSTER-JOHNSON REAMER CO.
1046 Beardsley Ave. Elkhart, Ind.

CONDENSITE
CELORON
SILENT TIMING GEARS

Insure perfect timing
Diamond State Fibre Company

"Bay
State"
Wrenches



Cold-
Drawn
Sockets

The Allen Mfg. Company, Hartford, Conn.



Bello, an electric-drive wet grinder for pistons, pins, valves, bushings, \$475.00.
Valvo, an electric-drive bench grinder for valves, valve-seat reamers \$175. See page ads this paper.

Van Norman Machine Tool Co.
Springfield, Mass.



Auxiliary firing-chamber gives it the explosive power of a howitzer. Carburetor must be adjusted **LEANER** immediately. Overcomes oil, self-cleaning.

Distributors wanted.

NT
SPARK PLUG

With the Explosive Spark

THE T. N. T. SPARK PLUG CO.
Cleveland, Ohio

**Monogram Light Distributors**

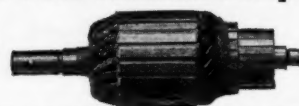
Standard equipment on 37 of America's foremost cars and trucks.

Pass I. E. S. rules and all state tests.

MONOGRAM LENS CORPORATION
52 Vanderbilt Ave. New York

Send Us Your Armature Repair Work

**FORD
ARMATURES
REWOUND
\$2.00**



**MOST ANY
TWO UNIT
GENERATOR
ARMATURE
\$5.00**

ALL WORK GUARANTEED—WRITE FOR PRICE LIST
U. S. AUTO SUPPLY CO., 3845-49 S. WABASH AVE., CHICAGO



There is a Harvey Steel Disc Wheel in the various styles which we make for each size of car at interesting prices.



Rim & Wheel Co., Inc.
25 E. Jewett Ave., Buffalo, N. Y.

51-6/10 MILES ON A GALLON OF GAS

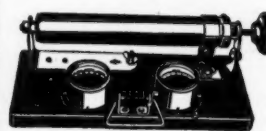
It is the official world's record-breaking test with Ford Touring car. The new 1922 Stromberg Carburetor and Hot Spot did it—made this marvelous mileage possible. Tens of thousands of Ford owners are now obtaining more miles on a gallon—quicker getaway—easier starting—increased power and speed—all because of having their cars so equipped. Live dealers are requested to write for facts pertaining to territory.

Stromberg Motor Devices Co.

64 E. Twenty-Fifth St.

Dept. 27

Chicago, Ill.

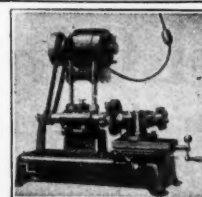
**TEST YOUR BATTERIES**

by the Chart Method. Something New. Send for free booklet, today.

Allen-Bradley Co.

Electric Controlling Apparatus

281 Greenfield Ave., Milwaukee, Wis.

**SAPIHL VALVE REFACTOR**

No Vibration, or End Play
TEN DAYS' FREE TRIAL

Besides refacing valves it will make money for you grinding pistons, contact points, bushings, reamers, etc. Built in two units and can be attached to lathe for internal and external grinding. Does the work of higher priced machines.

Write for illustrated circular and prices
General Tool & Equipment Co.

Distributors


70 W. Monroe St.

Chicago



MONOGRAM
The
Self Locking Radiator Cap

JOBBER



Do not overlook these live selling and profitable items. The metal is brass, heavy nickel plated and will not rust.

Four styles—one for every car. No. 503 with the Hump Base. No. 504 with Ell Base. No. 505 Plain Lock-Type. No. 506 Swivel Lock-Type.

Packed fifty to carton; five display cards of ten each.

The company that took the rattle out of Anti-Rattles

THE AUTOQUIP MFG. CO., Inc., 495 St. Paul St., Rochester, N. Y.

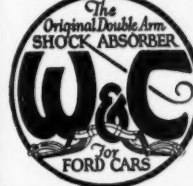
SAY "W. & C."

and Your Jobber Will Give You the Most Successful Time-Tried Shock Absorber for Fords

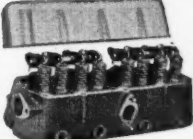
W. & C. Shock Absorbers Sell

P. H. WEBBER COMPANY

Hoopeston Illinois



FRONTENAC Cylinder Heads and FRONTY-FORDS



Designed and built by the famous race drivers and engineers, Arthur and Louis Chevrolet. Write for FREE Illustrated Catalog. Book on "How to Build a Fronty-Ford," \$2. Given free with orders of \$50 or more.

CHEVROLET BROS. MFG. CO.

410 W. 10th St. Indianapolis, U. S. A.


SPENCER

The Spencer Lock Tilting Steering Wheel first adds comfort in the driver's seat—then protects the car from theft. And the insurance it saves pays back the purchase price.

Ask your jobber for details. Made for Ford, Dodge, Overland, Chevrolet 490 and Superior, Maxwell, Star and Gray Cars.

Should Be On Every Car You Sell

The Spencer Mfg. Co., Spencer Ohio




ATLAS STEEL BALLS

Noted for Their Endurance in Service—The result of Accuracy, True Sphericity, Uniformity of Composition and High Resistance Against Fatigue.

ATLAS BALL COMPANY

Glenwood Ave. at Fourth St., Philadelphia, Pa.




The COURIER Six

Nine body types, from \$1,195 to \$2,165

THE COURIER MOTORS COMPANY

SANDUSKY, OHIO



DIAMOND

Automatic Automobile SAFETY SIGNAL

Dealers Wanted—Send for Folder

AUTOMOTIVE DISTRIBUTING CORPORATION

703 Finance Building Philadelphia




STEVENS TOOLS

OVER 50 WONDERFUL SHORT CUTS IN NEW CATALOG T-105

ASK FOR IT

STEVENS & COMPANY

375 BROADWAY, NEW YORK



The Utmost in Hoisting Efficiency

WRIGHT

Liabon, Ohio, U. S. A.

HIGH SPEED HOISTS



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Send sketch or model today for examination and report, Record of Invention blank on which to disclose your invention and NEW guide book, "How to Obtain a Patent," sent free. Promptness assured. Highest references. WRITE TODAY. CLARENCE A. O'BRIEN, Registered Patent Lawyer, 210 Southern Bldg., Washington, D. C.

Piston Pins TRINDL and Valves

Oversizes Standards Specials

Prompt shipment, highest grade materials, precision accuracy to closest dimensions and unexcelled workmanship. Send for specification and price lists—they make pin and valve buying simple.

THE TRINDL CO., 2917 Wabash Avenue, Chicago, Ill.




Motor Wheel PRODUCTS

Motor Wheel Corporation, Lansing, Michigan



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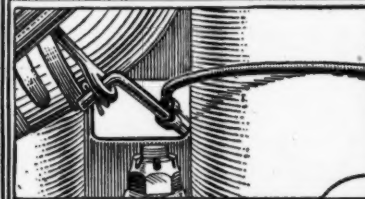
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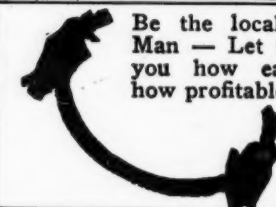
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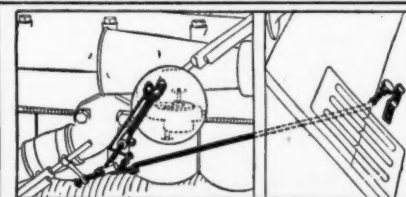
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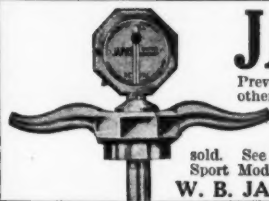


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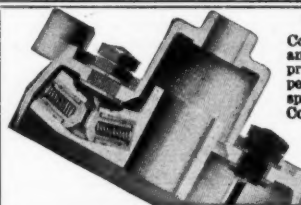
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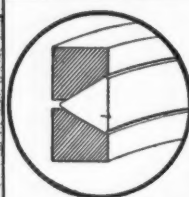


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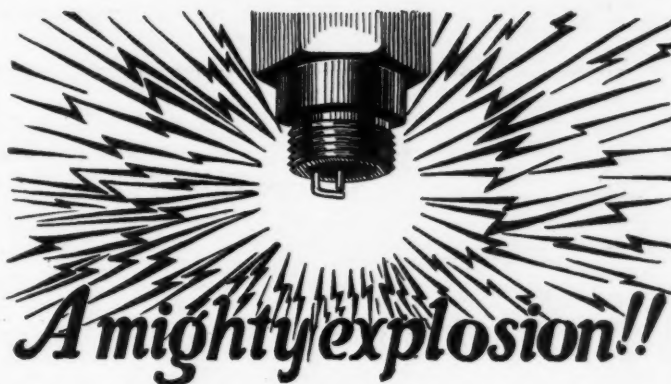
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7/8-inch Portable Electric Drill	\$125	\$15	\$110
No. 1 Electric Screwdriver.....	\$ 65	\$17	\$ 48
No. 2 Electric Screwdriver.....	\$ 80	\$12	\$ 68

Other Black & Decker Electric Tools were reduced in price earlier in the year as follows:

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1/2-inch Special Port. Elec. Drill	\$85	\$17	\$68
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